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ABSTRACT

The impact of electronic commerce (e-commerce) on Australia's National Training Framework (NTF) was studied for the purpose of forecasting future demand for training in areas related to e-commerce and identifying appropriate responses by the NTF committee. The following were among the study's main data collection activities: reviews of the international and Australian literature on e-commerce; workshops on the project for representatives from 15 industry training advisory boards (ITABs) and follow-up interviews with the attendees; interviews with a wide spectrum of industry representatives; and an analysis of new and emerging e-commerce courses in Australia. The study's main findings and conclusions were: (1) e-commerce is primarily a business issue rather than an information technology (IT) issue; (2) there is a growing appreciation of the importance of training to underpin the employment required to stimulate e-commerce in Australia; (3) many existing e-commerce courses in Australia are generic, aimed at beginners, or IT based and fail to cater to the full spectrum of business training needs; and (4) the preferred strategy for managing e-commerce within the NTF is to give priority to development of e-commerce competencies in a number of specific industry areas. (Twenty-five tables are included. Contains lists of personnel consulted and 40 references.) (MN)

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Report on the impact of e-commerce on the National Training Framework

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Executive Summary

This study of the impact of e-commerce on the National Training Framework (NTF) was undertaken by John Mitchell & Associates from November 1999 to January 2000, with assistance from the Industry Relationships section of the Australian National Training Authority (ANTA).

The following report confirms that the impact of e-commerce on the Australian economy will be substantial, resulting in an increased demand for training in e-commerce. The report recommends actions to respond to these training needs within the National Training Framework.

Project Brief

The aim of the study is to develop a project brief, informed by a contemporary definition and current advice, outlining the necessary work to ensure that e-commerce standards and desirable qualifications are available within industry Training Packages or can be addressed within the National Training Framework.

The specific purposes of the project are to:

1. Provide the National Training Framework Committee with a contemporary definition of e-commerce and its impacts upon the Australian economy, incorporating an analysis of Commonwealth Government strategies to influence e-commerce development. This is addressed in sections one and two of the report.

2. Provide advice to ANTA on the development of Guideline Standards for e-commerce in the context of the growing impact of e-commerce upon all industries, education and training. This is addressed in section seven.

3. Develop a detailed project brief for consideration by the National Training Framework Committee that will outline the necessary work to ensure that e-commerce standards and desirable qualifications are available within industry Training Packages or can be addressed within the National Training Framework. While sections three to six provide the rationale for the design of the project brief, to begin the work in this area, the project brief is not included in this report as it relates to ANTA's administrative and contractual operations.

The outcomes of the work associated with points 1 and 2 are included in this report. A Project Brief that draws heavily on this report will be released separately by ANTA.

Methodologies

The methodologies used to develop this report were as follows:

- a review was undertaken of the international literature on e-commerce and of Commonwealth Government reports on e-commerce

- a briefing paper on e-commerce was circulated to all Industry Training Advisory Bodies (ITABs) and Recognised Bodies in November 1999, to inform the consultations
- workshops on the project were conducted for representatives from fifteen ITABs and Recognised Bodies in Melbourne and Sydney on 15 and 16 November 1999
- follow-up interviews were conducted with other ITABs and Recognised Bodies in December 1999 and January 2000
- Australian developments in e-commerce were benchmarked against developments in the United Kingdom
- interviews were conducted with a wide spectrum of industry representatives, from small, medium and large businesses, in December 1999 and January 2000
- an options paper was prepared in December 1999, identifying a range of options for managing the issue of e-commerce and its impact on training
- an analysis was made of new and emerging courses in e-commerce in Australia.

A list of interviewees for this study is provided in Appendix 1.

Major Findings

The definition of e-commerce provided in this report is based predominantly on the three following sources: current, international literature, interviews with Australian industry leaders and recent research by the National Office for the Information Economy (NOIE). These sources demonstrate that e-commerce is primarily a business issue rather than an information technology (IT) issue. E-commerce is about new ways of doing business that are enabled by IT. E-commerce makes use of computer networks in new and more effective ways and involves all electronic communication used in business.

This definition fits with the views of the Commonwealth Government. For instance, in April 1999 NOIE announced that 'The Commonwealth Government is now embarking on a strategy...viewing e-commerce as a business issue rather than an information technology issue' *(Australia's e-commerce report card, p.20)* and reiterated in October 1999: 'E-commerce is about a different and more efficient way of doing business' (*E-Australia.com.au*, p.2). NOIE's detailed definition of the business and technological dimensions of e-commerce is as follows:

> In e-commerce, business is communicated and transacted over networks and through computer systems. The most restrictive definition limits e-commerce to buying and selling goods and services, and transferring funds through digital communications. However, e-commerce also may include all inter-company and intra-company functions (such as marketing, finance, manufacturing, selling and negotiation) that enable commerce and use electronic mail, EDI, file transfer, facsimile, video-conferencing, workflow or interaction with a remote computer. E-commerce also includes buying and selling over the World Wide Web and the Internet, transferring electronic funds, using smart cards and digital cash, and doing business over digital networks. (*E-Australia.com.au, October 1999, p.60*)

E-commerce is having a major impact on business structures and planning, countering the narrow definition of e-commerce as simply financial transactions over the Internet. This broad definition indicates that the training needs for e-commerce are cross-industry and pervasive. (*See Section One*)

E-commerce is likely to have a substantial impact on Australia's economy, if optimum conditions prevail, including the availability of an adequately trained workforce. E-commerce is already having an impact on a wide range of industries, from retailing to transport, media, entertainment and tourism, health, business services, communications, information technology, banking and finance. E-commerce is expanding the scope of some occupations, and resulting in the creation of new occupations. E-commerce will result in the re-structuring of entire industries over the next decade, and in many cases will change the way business is conducted, particularly with an Internet-based supply chain.

NOIE's economic analysis of the impact of e-commerce on particular industries provides ANTA with a defensible rationale for focusing on some industries before others, in relation to the development of competencies. An issue which will need to be managed is that NOIE's industry sectors do not equate exactly with the list of Industry Training Advisory Boards (ITABs) within the National Training Framework. *(Section Two)*

Consultations for this study revealed a growing appreciation of the importance of providing training to underpin the employment required to stimulate e-commerce in Australia. The consultations also revealed that there is an acceptance that e-commerce competencies are required in the workforce for a range of targeted groups at different qualification levels. However, many people have a limited understanding of e-commerce, particularly of the critical importance of business-to-business e-commerce. A number of ITABs have some concerns and they need more guidance about e-commerce. *(Section Three)*

Training courses on e-commerce in Australia can be expected to proliferate in the near future, and there may be considerable variations in the content, quality and style of these courses. Many of the current e-commerce courses are either of the generic type, aimed at the beginner, or are IT-based and do not cater for the full spectrum of business training needs. There is an opportunity for ANTA to show leadership by providing guidance and funding support in the development of e-commerce competencies and qualifications. *(Section Four)*

The research identified a large number of potential competency areas that could form the basis of initial planning with ITABs about what e-commerce competencies can be developed. *(Section Five)*

The August 1999 submission by the Information Technology and Telecommunications (IT&T) ITAB to develop e-commerce competencies deserves positive consideration, as IT&T provides the technology that enables the business applications of e-commerce. *(Section Six)*

There are a number of reasons for advising ANTA to limit the use of Guideline Standards for e-commerce, particularly in the first twelve-month period, during which competency standards for e-commerce will be developed. Despite the common sense behind the theory of Guideline Standards, they are new and untried, and the first exemplars from Food Safety are not due for release until March 2000. A number of key aspects of Guideline Standards need to be field-tested before the concept becomes widespread within the National Training Framework, including issues of status,

provision of guidance while maintaining flexibility and equivalence. Until the first exemplars of Guideline Standards are field-tested, it would be a high-risk strategy to invest too much effort developing Guideline Standards in e-commerce. ITABs lack experience with Guideline Standards and, at present, the ITABs generally have a negative perception of them.

The preferred strategy for managing e-commerce within the National Training Framework is to give priority to the development of e-commerce competencies in a number of specific industry areas. The use of Guideline Standards can be a supplementary strategy. If they are developed, then the development of Guideline Standards for e-commerce within the National Training Framework could be undertaken in stages, for trial purposes and with a range of industries, as part of an educational and information pack for ITABs. *(Section Seven)*

At their meeting on 16th March 2000, The National Training Framework Committee considered the penultimate E-competent Australia report and requested that ANTA progress this development of e-commerce within training packages.

1. A contemporary definition of e-commerce

Summary

This section of the report provides a co. .temporary definition of e-commerce. This definition is based predominately on the three following sources: current international literature, interviews with Australian industry leaders and recent research by the National Office for the Information Economy (NOIE). The definition supports the view that e-commerce is a business issue rather than an information technology issue and that e-commerce is about different and more efficient ways of doing business, particularly by using computer networks and harnessing them in new ways. The following quotation notes the business and technological dimensions of e-commerce:

> In e-commerce, business is communicated and transacted over networks and through computer systems. The most restrictive definition limits e-commerce to buying and selling goods and services, and transferring funds through digital communications. However, e-commerce also may include all inter-company and intra-company functions... E-commerce also includes buying and selling over the World Wide Web and the Internet, transferring electronic funds, using smart cards and digital cash, and doing business over digital networks. *(E-Australia.com.au, NOIE, October 1999, p.60)*

Introduction

This section provides the following information:

- a contemporary definition of e-commerce based on a variety of sources
- an analysis of Commonwealth Government strategies in relation to e-commerce.

The discussion will show that e-commerce is having a major impact on business structures and planning, countering the narrow definition of e-commerce as simply financial transactions over the Internet. The discussion will also show that the field of e-commerce is continuing to change, as the development of new technologies, the convergence of technologies and the development of new business models affect it.

Research methodologies

The development of this contemporary definition of e-commerce is the result of the use of a number of methodologies:

- an examination of recent Commonwealth Government reports
- a review of international literature and current media articles
- workshops, interviews and meetings with a range of ITAB and industry representatives from November 1999 to January 2000

- iterative dialogue about the definition of e-commerce, with a range of ANTA personnel, particularly personnel from the Industry Relationships section.

Definitions

The definitions of e-commerce have shifted over the last few years in two respects:

- initially e-commerce was defined as financial transactions over electronic communication, but the trend now is to define e-commerce as any business communication such as the exchange of information by electronic communication
- initially e-commerce was defined as the technical event of an electronic communication, but now the trend is to see e-commerce as an approach to business, with the technology as the enabler.

These two new trends are reflected in the recent definitions of e-commerce provided by NOIE, by international authors and by leaders in Australian industry, as set out below.

NOIE expended considerable energy in defining e-commerce, particularly in 1999, and arrived at a definition of e-commerce by late 1999 that matched the two new trends identified above. The discussion in this section of the report will show that NOIE investigated e-commerce extensively in 1999, and commissioned a number of world-class reports, including the summary of the economic impact study released in November 1999, *E-commerce – beyond 2000*.

It is important to note that the definition of e-commerce provided by NOIE changed marginally during 1999, to become broader. For instance, the following definition was provided by NOIE in April 1999 in *Australia's e-commerce report card*:

> E-commerce is defined as every type of business transaction in which the participants (i.e. suppliers, end users etc.) prepare or transact business or conduct their trade in goods or services electronically. *(p.3)*

While e-commerce is dominated by online technologies, the scope of e-commerce covers 'all forms of electronic processes':

> Online technologies are the most significant facets of e-commerce and include Internet retailing, Electronic Data Interchange, Internet banking, electronic settlements and browsing and selection of products and services over the Internet. *(p.3)*

A fuller definition of e-commerce was then provided in the Commonwealth's October 1999 report, *E-Australia.com.au*. The October 1999 definition widens the scope of e-commerce, and clarifies that e-commerce is not just about buying and selling goods, it is also about *inter*-company and *intra*-company activities:

> In e-commerce, business is communicated and transacted over networks and through computer systems. The most restrictive definition limits e-commerce to buying and selling goods and services, and transferring funds through digital communications. However, e-commerce also may include all inter-company and intra-company functions (such as marketing, finance, manufacturing, selling, and negotiation) that enable commerce and use electronic mail, EDI, file transfer, facsimile, video-conferencing, workflow, or interaction with a remote computer. E-commerce also includes buying and selling over the World

Wide Web and the Internet, transferring electronic funds, using smart cards and digital cash, and doing business over digital networks. *(p.60)*

This October 1999 definition is recommended as the main reference point for ANTA, taking into account that the nature and definition of e-commerce may change in future due to new developments in business and technology.

The following table summarises the definitions of e-commerce provided in four major NOIE publications in 1999, showing again that the definition broadened over the year to include more than just financial transactions. It is clear that e-commerce is every type of business transaction or interaction conducted electronically.

Table 1.1: Definition of e-commerce by the National Office for the Information Economy in 1999

	NOIE Publication	Date	Definition
1.	*The Sectoral Impact of E-commerce - A Scoping Study* (Electronic Trading Concepts et al)	March 1999	A form of commercial transactions involving both organisations and individuals which are based upon electronic processing and transmission of data (p.3)
2.	*Australia's e-commerce report card*	April 1999	E-commerce is defined as every type of business transaction in which the participants (i.e. suppliers, end users etc.) prepare or transact business or conduct their trade in goods or services electronically. (p.3)
3.	*E-Australia.com.au*	October 1999	In e-commerce, business is communicated and transacted over networks and through computer systems. (p.60)
4.	*E-commerce - beyond 2000* (Allen Consulting Group)	November 1999	At its broadest, e-commerce is any type of business transaction or interaction in which the participants operate or transact business or conduct their trade electronically. (p.5)

While the above definitions focus on the electronic transmission of data – that is, on the technological event – the Commonwealth Government has also consistently emphasised the new business thinking underpinning e-commerce, as set out in Table 1.2, to the point where the Government is now 'viewing e-commerce as a business issue rather than an information technology issue' (*Australia's e-commerce report card*, 1999, p.20).

Table 1.2: Business principles of e-commerce highlighted by the National Office for the Information Economy in 1999

Source	Date	Description
The Sectoral Impact of E-commerce - A Scoping Study Electronic Trading Concepts et al. for NOIE)	March 1999	E-commerce is part of an evolving approach to business that could eventually involve the application of information and communication technologies (ITC) to the production and distribution of goods and services on a global scale. (p.3)

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Australia's e-commerce report card (NOIE)	April 1999	The Commonwealth Government is now embarking on a strategy ... viewing e-commerce as a business issue rather than an information technology issue. (p.20)
E-Australia.com.au (NOIE)	October 1999	E-commerce is about different and more efficient ways of doing business. (p.2)
E-commerce - beyond 2000 (Allen Consulting Group for NOIE)	November 1999	E-commerce will bring significant changes to business, consumers, government and the economy. Companies are changing the way they do business. (p.2)

Highlighting the business thinking behind e-commerce reflects a tendency noted by Hammer and Champey (1993):

> The real power of technology (such as electronic commerce, telecommunications technology services or multi-media) is not that it can make the old processes work better, but that it enables organisations to break old rules and create new ways of thinking – that is, to reengineer.

The following interviewees for this study placed a similar emphasis on e-commerce providing new ways of doing business:

> The modus operandi and business models in all industries will be re-invented because of e-commerce. (Mr Phil Kiely, Managing Director, Oracle, interview, 13 January 2000)

> The changes due to e-commerce are quite mammoth. It is totally challenging the way we do business and the relationships between buyers and sellers. (Ms Judith Maddocks, National Business Manager, Telstra Learning, interview, 28 January 2000)

> If you are doing business electronically, you are doing business differently and there are different skills and competencies required. It is not just a matter of transferring conventional skills to e-commerce. The capacity to undertake business electronically will be a core competency in the future. (Mr David Edwards, Executive Director, Australian Society of Certified Practising Accountants, interview, 19 January 2000)

> E-commerce is essentially re-engineering businesses. (Mr Cliff Smith, Managing Director, Novell Australia, interview, 7 January 2000)

> I see e-commerce mainly as a business issue not an issue with IT as the enabler or deliverer; for without users, IT is nothing. Some IT people lose sight of the bigger picture. The important issues are what does business want to achieve and how does IT fit with the business strategic plan. (Mr John Ridge, President, Australian Computer Society, interview, 12 January 2000)

Given the above focus on the fundamental business principles underpinning e-commerce, it is no surprise that the Commonwealth Government, through the various NOIE studies, focuses on the importance of business-to-business (B2B) e-commerce. NOIE sees most economic benefit arising from this form of e-commerce, compared to the higher profile business-to-customer (B2C) form of e-commerce. The following table provides some brief definitions of these and other key terms in the field of e-commerce.

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Table 1.3: Definitions of key terms in e-commerce

Term	Brief Definition
E-commerce	every type of business transaction in which the participants (i.e. suppliers, end users etc.) prepare or transact business or conduct their trade in goods or services electronically
E-business	in this report, e-business is taken to mean an individual company, enterprise or organisation, or business unit, that uses e-commerce, e.g. the online travel agency travel.com.au could be called an e-business. Some people see the term e-business as interchangeable with the term e-commerce.
Business-to-business e-commerce (B2B)	the use of e-commerce between two companies; e.g. a hospital pharmacy electronically orders a drug from a pharmaceutical supplier who then orders it electronically from a manufacturer
Business-to-customer e-commerce (B2C)	the use of e-commerce between an enterprise and a customer; e.g. a customer orders a CD-ROM online from an online music store
Disintermediation	reduces or makes redundant the role of 'middlemen' or other middle supply chain elements as newer, more efficient supply chain technologies are implemented; e.g. an online travel agent removes the need for a shop-front travel agency
Re-intermediation	the use of e-commerce to create new value between producers and consumers; e.g. a newspaper makes its advertisements available on a web site
Extranet Gateways	web-based networks that allow trading between business partners along the supply chain, linking manufacturers, wholesalers, suppliers, vendors and retailers in an industry sector, and integrating transport and logistics; e.g., the new pharmaceutical ordering system in Australia, PEG, involving 5 wholesalers and 700 manufacturers

To reinforce the point that e-commerce provides new business models, Timmers (1999) identifies eleven business models that are being used both in the business-to-business and business-to-consumer arenas. He notes (p.31) that:

- some of the e-commerce business models are simply an electronic version of an existing 'physical world' business model while others are more innovative
- some of the e-commerce business models are experimental while others are in full commercial operation.

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Table 1.4 E-commerce business models (Source: Timmers, 1999, pp. 35-40)

	Term	Brief Definition
1.	E-shop	Web marketing of a company or a shop
2.	E-procurement	Electronic tendering and procurement of goods and services
3.	E-malls	A collection of e-shops, usually enhanced by a common umbrella or 'portal' site
4.	E-auctions	An electronic implementation of bidding mechanisms, integrated with contracting, payments and delivery
5.	Virtual communities	Members adding their information to a web site
6.	Collaboration partners	A set of tools and an information environment for collaboration between enterprises
7.	Third-party marketplaces	Common marketing front-end and transaction support to multiple businesses
8.	Value-chain integrators	Adds value by integrating multiple steps of the value chain
9.	Value-chain service providers	Supports part of the value chain, e.g. logistics, payment
10.	Information brokers	Provision of information and consultancy services, adding value to the huge amounts of data on open networks, e.g. information searches, customer profiling
11.	Trust services	Services provided by trusted third parties including certification authorities and electronic notaries

While most attention in the media is paid to the business models for business-to-customer exchanges, such as e-shops, e-malls and e-auctions, e-commerce analysts stress that the major economic impact of e-commerce is derived from lower profile business-to-business activity such as e-procurement.

International definitions

For consistency, this report recommends that ANTA adopt the NOIE definition of e-commerce. However, other definitions of e-commerce available in the international literature are acknowledged below. The following discussion will show that NOIE's definition is compatible with the definitions in the current, international literature.

Kalakota and Whinston (1997, p.3) noted that the definition used for e-commerce depends on the perspective taken, and they identify four different perspectives for viewing e-commerce.

Table 1.5: The definition of e-commerce from four perspectives (Kalakota and Whinston, 1997, in Lawrence et al 1998, p.3)

Perspective	Description
Communications	e-commerce delivers information, products/services and payments over telephone lines, communication networks or other means
Business	e-commerce automates business transactions and work flows
Service	e-commerce cuts service costs while improving the quality of goods and increasing the speed of service delivery
On-line	e-commerce provides the capability of buying and selling products and information over the Internet and other on-line services

Lawrence et al (1998) note that there has been an explosion of names to identify doing business electronically, 'such as electronic commerce, eCommerce, iCommerce, Internet commerce and digital commerce' (p.2). Lawrence et al use the terms 'electronic commerce' (or e-commerce) and 'Internet commerce' interchangeably. They then define e-commerce as follows:

> Electronic commerce can be defined as the buying and selling of information, products and services via computer networks today and in the future, using any one of the myriad of networks that will make up the Internet. *(pp. 2-3)*

Turban et al (2000) importantly add the word 'exchanging' to the definition of Lawrence et al, to cater for more than just financial activities:

> Electronic commerce is an emerging concept that describes the process of buying and selling or *exchanging* of products and services and information via computer networks including the Internet. *(p.4; italics added)*

Turban et al (2000, p.5) observe that e-commerce can occur in a 'pure' form (e.g. ordering and receiving software via the Internet) and in a partial manner (e.g. ordering a book via the Internet and receiving it from a courier). They suggest (p.5) that e-commerce ranges from 'pure' to 'partial' depending on the degree of digitization of the product (or service), the process and the delivery (or intermediary).

The NOIE position on e-commerce can accommodate the refinements to the definition of e-commerce made by Kalakota and Whinston (1997), Lawrence et al (1998) and Turban et al (2000). The NOIE definition is close to Timmers (1999) who provides a broad but simple definition of e-commerce as 'doing business electronically'. *(p.4)*

Sample B2B and B2C activities

The various 1999 NOIE reports document some of the leading-edge activities in Australia in business-to-business (B2B) e-commerce. Some of the outstanding case studies are as follows:-

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Table 1.6: Examples of business-to-business (B2B) e-commerce activities in Australia

Industry	e-business	Description
Manufacturing	Pharmaceutical Extranet Gateway (PEG)	5 wholesalers and 700 manufacturers have agreed to use a common numbering system and an open Internet-based ordering system.
Automotive	Australian Automotive Network Exchange (AANX)	The four Australian car manufacturers (Ford, Holden, Toyota and Mitsubishi), importers, suppliers and associations have agreed to use a common Extranet Gateway trading environment.
Food & Beverage Procurement	Food & Beverage Procurement project initiated by the Tasmanian Electronic Commerce Centre	The project links the entire supply chain in the food and beverage procurement industry, and is a model for online supply, procurement and distribution.
Transport & Distribution	Australiawide Loading Information Service (ALIS)	Streamlines the matching of empty trucks and loads requiring transportation, through telephone, fax and proposed web site contact.
Horticulture	GreenNet www.greennet.com.au	Online ordering of plants for retailers.
Food and Beverage	FoodConnect Australia www.foodconnect.com.au	Online site assisting the export of food and beverage.

The following table describes a sample of Australian e-businesses, from a range of industries, which specialise in business-to-customer (B2C) e-commerce.

Table 1.7: Examples of business-to-consumer (B2C) e-commerce activities in Australia

Industry	Business	Description
Entertainment	ABC Online www.abc.net.au	Online information, entertainment and educational services
Government services	Maxi (NEC and Aspect) www.aspect.com.au	Online government services in Victoria
Tourism	Travel.com www.travel.com.au	Online travel service
Automotive	discpads.com www.discpads.com	Online sales of brake pads
Real Estate	domain.com.au	Fairfax's online real estate site
Education	Educom Training	Technical, PC and HR training

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	www.educom.com.au	
Education	TechWorks www.techworks.com.au	Online education systems
Business services	e-Bill www.e-bill.com.au	Enables customers to access their accounts and to arrange payments
Retail: auctions	NedKelly.com.au	Online auction house in Western Australia
Retail: toys	ToySpot.com.au	Online toy retailer
Retail: wine	Wineplanet www.v ineplanet.com.au	Online liquor retailer
Retail: various	131.Shop www.131shop.com	Online retailer
Retail: groceries	Greengrocer.com.au www.greengrocer.com.au	Fruit and vegetable home delivery service based in Sydney
Retail: florist	FloraNet www.floranet.com.au	Online florist shop
Retail: swimwear	Absolut Beach www.absolutbeach.com.au	Online sales of swimwear
Financial services	Webloans www.webloans.com.au	Online mortgage broker
Financial services	Your Prosperity www.yourprosperity.com.au	Online investment service
Health	Health Communications Network www.hcn.com.au	Online medical databases and services
Information technology	Icon www.iconrec.com.au	IT recruitment company

From the above examples it is clear that e-commerce has created new opportunities for many companies. Behind these e-businesses are often other companies which provide the infrastructure, systems and support required. The following table sets out a sample of companies operating in Australia which provide some of the technology and services required for e-commerce.

Table 1.8: Examples of Australian companies supplying services and products required for e-commerce

E-commerce products and services	Examples of Australian-based companies
Hardware, software, consulting, design, integration	Oracle, EDS, Microsoft, Novell, Scitec, Adacel, Sausage Software
Telecommunications/Internet service providers	Telstra, Ozemail, Optus, eisa
Recruitment	Icon, DMA, Greythorn, Morgan & Banks
Training	Aspect, ComTech, EDUCOM, NSW TAFE
Smart cards and secure online transactions	Camtech, Keycorp, IHG, ERG

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The above table lists only the larger companies involved in providing services and products required by e-commerce. A myriad of smaller consulting, software development, training and Internet Service Providers also supply services and products. A number of these smaller companies were interviewed for this report and are included in Appendix 1.

Origins, enablers, growth, benefits and barriers

The emergence of e-commerce is due to the congruence of new information and telecommunication technologies with new business practices during the 1990s. The origins of e-commerce can be traced back to automation in the financial services industry, particularly the use of Electronic Data Interchange (EDI), automatic teller machines (ATM), electronic funds transfer (EFT) and telephone touch-tone banking in the mid-1990s. With the availability of the Internet in the mid-late 1990s, banks began offering customers the opportunity to access their accounts on the Internet via modems. Simultaneously, other businesses began using EDI for accounts purposes, and also realised the potential benefits of using electronic communication, including e-mail and the World Wide Web, with customers.

The major new stimulant to e-commerce in the late 1990s was Internet commerce (*Australia's e-commerce report card*, NOIE, 1999, p.1). The report *E-commerce – beyond 2000* (NOIE, 1999) underlined the rapid growth in the use of the Internet for e-commerce:

- Internet-based commerce in Australia is predicted to grow from $61 million in 1997 to $1.3 billion in 2001.
- The number of business web sites in Australia doubled between 1996 and 1998.
- There has been a doubling or better in annual revenues in recent years for several Australian companies which supply Internet systems or know-how.

Australian consumers are also becoming more active on the Internet. The Australian Bureau of Statistics, in its publication 'Use of the Internet by Householders, Australia', May 1999, reported that there were three million Internet purchases in the preceding twelve months:

> Nearly 5% of Australian adults (650,000) used the Internet to purchase or order goods or services for their own private use in the 12 months to May 1999. These Internet shoppers made an estimated 3 million purchases or orders via the Internet and nearly 76% of Internet shoppers paid for their purchases online. By comparison, in the 12 months to May 1998, an estimated 409,000 adults purchased or ordered goods or services via the Internet.
>
> Nearly 71% of Internet shoppers (459,000) were at home when making purchases or orders via the Internet. Just over 41% of Internet shoppers made their purchases only from Australia, 43% made them only from overseas, and 16% from both Australia and overseas.

The ABS report also showed that the main purchases over the Internet were for books or magazines, computer software or equipment, music, clothing, shoes, holidays, entertainment and sporting equipment. Extensive media publicity in late 1999 in relation to the online selling of Christmas presents in Australia confirms the growth of this business-to-customer form of e-commerce.

To date, the full potential of electronic communication has been limited by a number of issues, particularly:-

- the development of security protocols and the provision of reliable systems;
- legal issues, such as concerns about privacy and confidentiality;
- attitudes, such as some customers' lack of confidence in the new electronic systems.

The BRW magazine (29 October 1999) reports that Asia-Pacific Economic Cooperation (APEC) examined early adopters of e-commerce in twenty-one member countries in its recent *SME Electronic Commerce Study*. The report identified the following potential benefits of and barriers to e-commerce, arranged in descending order of importance.

Table 1.9: Benefits of and barriers to e-commerce (Source: APEC in BRW, 29 Oct 1999)

Potential Benefits	Potential Barriers
1. improve customer service	1. low customer e-commerce use
2. enhance company image	2. concern about security
3. customer information exchange	3. legal and liability concerns
4. improve competitive position	4. low supplier e-commerce use
5. increase customer loyalty	5. high cost of technology
6. access international markets	6. limited knowledge of business models
7. increase revenue	7. limited knowledge of technology
8. reduce costs of information	8. not convinced of benefits
9. supplier information exchange	9. concerns about telecom services
10. attract new investment	10. Year 2000 concerns
11. reduce procurement costs	11. computerisation in firms too low

Analysis of Commonwealth Government strategies

The Commonwealth Government is actively stimulating the adoption of e-commerce in Australia. The Commonwealth's report *Australia's e-commerce report card* (April 1999) itemised a range of e-commerce strategies:

1. **Establishing the environment conducive to the widespread adoption of e-commerce.** The Commonwealth has a range of initiatives that ensure a balanced and predictable legal and regulatory environment for e-commerce. Australia also participates on a number of fora to ensure our interests are represented in international developments around e-commerce.

2. **Demonstrating the business case.** A number of initiatives are designed to demonstrate the business case of using e-commerce. These initiatives are the next step beyond the initial awareness raising activities conducted last year to educate business and consumers of the benefits of doing business electronically. The Commonwealth is partnering with industry and other governments in the Online Australia Year program and a range of collaborative projects designed to provide business solutions.

3. **Targeting barriers to the development of e-commerce.** There are certain barriers that are being addressed to stimulate the growth of business-to-business e-commerce. For example, a national inquiry is under way into bandwidth capacity and the impact of incompatible information technology systems on business efficiencies.

4. **Maximising the efficiency dividend from e-commerce for the economy at large.** The Commonwealth is partnering with industry to ensure widespread returns from e-commerce uptake are maximised throughout the economy. This includes work in exemplar supply chain management models and key enabling business-to-business e-commerce projects. In addition, the Commonwealth is developing business friendly e-commerce systems to improve the efficiency and quality of service to the community and industry. *(p.2)*

A number of case studies of effective e-commerce businesses are highlighted throughout *Australia's e-commerce report card* (March 1999) and *E-Australia.com.au* (October 1999) to demonstrate real business examples of adopting e-commerce. These case studies show businesses using e-commerce as a key tool to improve efficiencies and to increase revenue as they adopt e-commerce strategies as part of a broader business plan.

In 1999, NOIE, together with 13 industry partners, funded a pilot study into the economic impacts of electronic commerce. The summary report was released on 17 November 1999 and was entitled *E-Commerce – beyond* 2000. It is believed to be the first such analysis of a national economy in the world and its findings are discussed in some detail in the following section. The full report was released in February 2000.

Commonwealth Government reports and discussion papers related to e-commerce, beginning in December 1998, include those set out in Table 1.10.

Table 1.10: A sample of Commonwealth Government reports related to e-commerce since Dec. 1998

	Report	Brief Definition
1.	A Strategic Framework for the Information Economy: Identifying Priorities for Action	A national strategy for enabling Australia's participation in the information economy.
2.	The Sectoral Impact of Electronic Commerce - A Scoping Study	A report on the search for studies about the economic impact of e-commerce in Australia and overseas.
3.	Australia's e-commerce report card	The report sets out Commonwealth Government strategies to accelerate the use of e-commerce across all sectors of the economy.
4.	Use of the Internet by Householders. Australia	Statistics on Internet usage in Australia.
5.	From telehealth to e-health: the unstoppable rise of e-health	An analysis of the emergence of e-health in Australia.
6.	E-Australia.com.au	This report looks at opportunities to accelerate supply chain e-commerce through the development of business cases.
7.	E-commerce – Beyond 2000	A summary analysis of the effect of e-commerce on Australia's economy to the Year 2016.
8.	Commonwealth Government Online – Progress Report, December 1999	A report on Commonwealth Government activity in online activities in 1999.
9.	Skill shortages in Australia's IT&T industries	The report of the Commonwealth's IT&T Skills taskforce to examine skills shortages in the IT&T industries and identify possible options.
10.	National Authentication Authority	A discussion paper on a proposed model for a National Authentication Authority to establish procedures for electronic authentication.
11.	Self-regulatory Regime for the au.Domain Space	A discussion paper on the development of a self-regulatory regime for the Australian domain name system.
12.	Trucks Online – National Road Scoping Study	A description of the use of e-commerce by the road transport industry.
13.	Getting Paid on the Internet	A guide for smaller companies on how to accept credit card payments over the internet.
14.	Where to go? How to get there.	A guide to e-commerce for small business.

The breadth of these reports is an indication of the pervasive nature of e-commerce and the serious intent of the Commonwealth Government to provide advice and guidance for Australians on this matter.

2. Impacts of e-commerce on the Australian economy in relation to the NTF

Summary

This section provides a summary of the impacts of e-commerce upon the Australian economy, identifying the industry sectors which will be most affected by e-commerce. The discussion highlights the importance of providing training to underpin the employment required to stimulate the growth of e-commerce. Available research on e-commerce provides ANTA with a rationale for selecting some industries for early attention, with regard to the development of e-commerce competencies.

Impacts on the Australian economy

The discussion below examines the economic imperatives driving the growth of e-commerce and the potential scope of the impacts. The theme emerging is that e-commerce will restructure entire industries over the next decade.

A*ustralia's e-commerce report card* (1999) notes that there are many economic imperatives for increasing the uptake of e-commerce in the Australian business sector, such as:

- lowering the cost of doing business through lower transaction costs and faster and more efficient payment from suppliers and/or customers which increases cashflow;
- the competitive business advantages afforded by e-commerce such as opportunities to adopt new business models and to develop and tailor more efficient customer support;
- reductions in inventory lowering the holding costs of goods;
- expansion to potential market reach;
- increasing speed to market; and
- 'trickle down' effect through a supply chain as suppliers come online. (p.8)

Continuing the point made in section one, industry researchers believe that business-to-business (B2B) e-commerce will be much more significant than business-to-consumer (B2C) e-commerce, even though the latter gains more public attention. For instance, *The Australian* (2 November 1999) quotes Forester Research as claiming that B2B e-commerce will generate $2 trillion in revenues by 2003, worldwide, twelve times what it expects of the B2C market. The *Australian Financial Review* (16-17 October 1999) cites www.consult's estimate that B2C e-commerce in Australia will be worth $920m for the year, while B2B e-commerce will be much larger, but harder to quantify.

The Commonwealth is very clear about the overall benefits of e-commerce to the economy:

> E-commerce allows business to be done more efficiently, as it is driving changes across many sectors of the economy and producing a more efficient allocation of resources. This will generate a significant growth dividend economy-wide. (Senator Alston, Foreword, *E-commerce - beyond 2000*, NOIE, Nov 1999).

The many new technologies used for e-commerce are helping to change jobs, communication patterns and industries:

> E-commerce is about a different and more efficient way of doing business. It is currently reshaping entire industry sectors. (*E-Australia.com.au*, 1999, p.2)

E-commerce impacts on all business processes: design, production, marketing, distribution, sales and service. It is now used extensively in Australia for market research, marketing, selling goods and the provision of many human services. Managing Director of Oracle in Australia, Mr Phil Kiely, believes that

> The Internet is making Australian companies take a long, hard look at their businesses. Some thought the Net was only good for delivering banner ads, but others are starting to conclude that a good Net strategy will change the way they go to market. (*The Australian*, 26 October, 1999)

E-commerce is permanently destroying some old ways of doing business and creating new ones. Due to the availability of e-commerce, new strategies are required for planning and managing many businesses. For example, in the field of marketing, e-commerce enables businesses of any size to market their goods and services globally, to pitch at niche markets, or to market to mass audiences.

The Commonwealth Government believes that e-commerce will result in the restructuring of entire industry sectors over the next decade, confirming the wide-ranging impacts of electronic commerce:

> The net benefits to the economy will be substantial, resulting in productivity gains and higher economic growth. Industry sectors that offer products and services amenable to electronic commerce will share these benefits. (*E-Commerce – beyond 2000*)

Economic impact study

In 1999, NOIE commissioned a study of the economic impact of e-commerce within Australia by the Allen Consulting Group in liaison with a group of partners. The summary from the resultant report, *E-Commerce – beyond 2000*, predicts that the net impact of e-commerce within the next decade could be a 2.7 per cent increase in the level of national output, and that it could enhance consumption by about $10 billion per annum.

> Growth in the order of 2.7% of GDP should not come as a surprise. The fact that market participants are embracing the new technology at a pace that is astonishing indicates that there is already widespread agreement that the opportunities are extensive. (*E-Commerce – beyond 2000, p.18)*

The *E-Commerce – beyond 2000* report perhaps under-estimates the impact of e-commerce by concentrating upon aspects of e-commerce that involve transactions (financial or otherwise) conducted over open non-proprietary networks, such as the Internet. In other publications in 1999, NOIE defined e-commerce as all electronic communication, including Intranets. A number of prominent industry interviewees for this study generally concurred that the impact of e-commerce would be much more extensive than suggested in this report.

The report notes that the main sectors which are expected to expand in future are those which offer products and services which are amenable to e-commerce. This includes sectors such as media and entertainment (including hospitality and tourism) and banking and finance. Some sectors will benefit more because of flow-on effects, as changes ripple through the economy. On the other hand, industry sectors which are essentially 'disintermediated' by the use of e-commerce (such as retail and wholesale trade) may have lower outputs than otherwise. Industries involved in commodity exports may be sensitive to flow on impacts, particularly higher real wages and a higher real exchange rate (*E-Commerce – beyond 2000 p.2*).

The *E-Commerce – beyond 2000* report notes that the efficiencies brought about by e-commerce are expected to result in changed employment opportunities. Some sectors will expand and increase in job numbers, while others will shrink. However, overall, employment will expand. Demand is likely to be strongest in occupations which are related to tourism and associated support services. *(pp.2-3)*

E-Commerce – beyond 2000 notes that, while all States are winners from the efficiency gains likely to be brought by e-commerce, some States are likely to benefit more than others. States which have a high reliance on traditional export activities will have to deal with larger offsetting costs. *(p.3)*

On the other hand, the *E-Commerce – beyond 2000* report considers that the use of open access networks for commerce opens up new network efficiencies that should have major economic dimensions. The following table from the report summarises four types of opportunities provided by e-commerce.

Table 2.1: Economic opportunities provided by e–commerce (From: *E-commerce - beyond 2000*, p. 7)

Economic Opportunity	Brief Description
1. Changes in production costs	E-commerce will allow firms to extend 'just in time' processes to reduce inventories and other input costs. It may also streamline purchasing and order processing systems, reduce the cost of finding and processing sales, and the cost of after sales service. These improvements should increase productivity.
2. Changes in the value added chain	E-commerce changes the cost trade-offs between individually tailored and mass-produced goods and permits interaction with customer requirements, and greater interaction within a supply chain, as a result. The value added chain becomes a value added business network, systemic not linear. E-commerce also allows buyers and sellers to cut out margins between producers and consumers, such as retailers and wholesalers, in a process known as disintermediation. Re-intermediation may occur as new types of intermediaries are introduced to the value added chain.
3. Changes in international competitiveness	Businesses have greater scope to advertise and sell their products into a global market at lower cost. Australia also becomes a market that is

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	more accessible to foreign businesses.
6. New products and ways of doing things	It is likely that the impact of e-commerce will be magnified many times over when changes in capacity are reflected in completely new products and services. The overall nature and impact of such new products, however, is particularly difficult to assess at this time.

The *Commerce – beyond 2000* report assessed the implications of the greater use of e-commerce by industry in consultation with their industry Reference Group. Some major implications for industry sectors are summarised in the table below.

Table 2.2: Implications of e–commerce for industry (From: *E-commerce - beyond 2000*, pp. 8-9)

Sector	Observations
Information Technology	A key enabler of e-commerce, demand for information technology will grow commensurately. IT products, such as software and hardware, are increasingly bypassing traditional intermediaries. Exponential growth in computing power will unlock further applications of e-commerce.
Communications	Major input sector to e-commerce. New demands will alter inputs required and allow intermediaries to be bypassed. New technologies, such as Wireless Access Protocol (WAP) will have a large impact on the future conduct of e-commerce.
Health	Significant efficiencies stand to be made in pharmaceutical supply chains. New service modes and channels to the consumer will be developed, as will expanding electronic modes of operation, such as telemedicine.
Education	Greater opportunities for distance education and improved efficiencies through online processes to bypass traditional administrative functions.
Banking and Finance	An information-intensive industry with an established IT infrastructure, this sector will be able to extract greater efficiencies and bypass traditional cost structures, such as the branch structure. Banks are looking at ways to expand their value proposition by linking new services to their existing customer base.
Business Services	Range of professional 'knowledge' services will benefit from greater efficiencies in dealing with suppliers and clients through electronic service delivery. Some traditional cost structures will be altered. New products and services will be created, such as legal authorisation of electronic documents or data registry services.
Media and Entertainment	A high profile industry, online forms of media and entertainment will compete with traditional forms for audiences, customers, and advertising revenue. New distribution and recording technologies, such as MP3, will challenge traditional systems.
Manufacturing	Beneficiaries of major productivity gains from previous forms of e-commerce such as EDI, manufacturing may extract further efficiencies made possible through open networks. Companies can build stronger relationships directly with customers including by selling products directly on-line.
Retail	Traditional retail faces increased competition from on-line competitors with more effective product range and cost structures. Bypassed to varying degrees by consumers making on–line purchases directly with producers or new infomediaries, especially in digital products and commodities such as books and CDs.
Transport	Improvements in supply chains will generate efficiencies and possible disintermediation. Greater productivity may also lead to decreased demand for labour. Additional value can be built into customer relationship, such as Qantas frequent flier points website, or the 70 percent of tickets sales that are e–tickets.

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The *Commerce – beyond 2000* report noted that the overall level of output, or GDP, might be higher by around 2.7 per cent in 2007 if Australia adopts greater use of e-commerce, than if it doesn't. The report predicts that, using the current size of the economy as an indicator, that is equivalent to an increase of more than $14 billion per annum. Three broad factors are needed to drive this result:

- the economy makes better use of existing capital and labour (through technological change)
- more capital is invested in the economy
- there is more employment reflecting increased labour that is made available through greater use of e-commerce.

The above points indicate the importance of training in underpinning the employment required for the growth of e-commerce.

An immediate challenge is to clarify in which industries the training needs to be focused. The following table produced for *E-commerce – beyond 2000* indicates the industry sectors most likely to be affected by the growth of e-commerce; this is an important table in defining where training is required.

Table 2.3: Industry impacts of e-commerce in Australia (from *E-commerce – beyond 2000*, pp. 14-16)

Industry Sector/ Classification	Comment on impact
Entertainment and Hospitality	Ranked first by output in the final year of the simulation period. This sector benefits from growth in tourism exports and in consumption. Tourism exports grow strongly relative to other exports.
Transport	This sector owes its high ranking to air transport. Air transport benefits from tourism demand.
Communication	Cost reductions are achieved in this industry via e-commerce. Demand rises for industry outputs used to facilitate e-commerce activity.
Banking and Finance	Achieves major cost reductions via e-commerce. However, expansion of the sector is limited by low price-sensitivities of demand.
Education	Education increases facilitated by higher government revenue.
Health	Health expenditure increases facilitated by higher government revenue (a flow on implication of higher levels in activity).
Food products	Adversely affected in the early part of the simulation period by real appreciation. Later, the sector's exports recover as the real exchange rate weakens. Eventually output will have a positive deviation reflecting growth in consumption.
Other manufacturing	The output paths for most of these industries are closely related to that of investment. Industries highly exposed to import competition are adversely affected by real dollar appreciation especially in the early years of the simulation period. Industries with considerable export potential will perform well.

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IT and other equipment	Industries in this sector are influenced by a variety of factors. Export-oriented industries (such as agricultural and construction machinery) benefit from e-commerce via increased foreign awareness of their products. The other industries in the sector benefit from stronger investment and consumption but are harmed by increased competition from imports arising from a stronger real exchange rate.
Transport equipment	This sector is dominated by the motor vehicle industry. Output from the Australian motor vehicle industry is highly sensitive to the real exchange rate. In the early part of the simulation period the industry suffers from import competition brought about by a high real exchange rate. Later when the real exchange rate falls, the industry shows positive output deviations associated with increased activity in the economy.
Business Services	Achieves major cost reductions via e-commerce. However, expansion of the sector is limited by the strong link between business services and wholesale and retail trade.
Wholesale and retail trade	The fall in this sector is dominated by the negative result for retail trade. Retail trade contracts as e-commerce permits traditional retailing to be by-passed.

The *E-Commerce – beyond 2000* report (p.16) also identifies industries that are not affected as positively, singling out many traditional sectors, such as mining, metal products and textile, clothing and footwear (TCF). With the expansion of e-commerce, exports from these sectors become relatively more expensive abroad and face greater competition domestically from relatively cheaper imported goods. The report also points out that, in the agriculture sector, industries producing traditional export commodities (e.g., wool, grain and meat) perform poorly relative to industries producing food for the domestic market or inputs (e.g., grapes) used in emerging export products.

The *E-Commerce – beyond 2000* report (p.18) indicates that the major 'winning' occupations from e-commerce are associated with hotels, restaurants, entertainment and air travel. These are the industries that will benefit from an e-commerce-related expansion of tourism. In addition, there is a varying degree of increased demand for professionals in health, education, business, information technology, finance, accounting and law. These industries benefit from e–commerce efficiencies.

The *E-Commerce – beyond 2000* report (p.18) predicts that occupations which will experience a decline in demand for their services are in areas such as (conventional) printing, retailing, TCF, ground transport and banking. (While conventional printing and retailing may be losers, e-commerce approaches to printing and retailing could be expected to be winners.) Employment in transport is reduced by e-commerce related labour–saving technical change. The TCF sector is harmed by the real appreciation associated with increases in real wage rates. It is expected that greater use of e-commerce for banking purposes will reduce the demand for teller staff.

The overall findings from the *E-commerce - beyond 2000* report reinforces the current thrust of the Commonwealth Government's approach to policy:

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> The benefits are of such an order of magnitude that the government should continue to seek to ensure rapid adoption of e-commerce. It should continue its thrust of seeking to remove or alleviate the impact of market impediments. *(p.19)*

One such market impediment is the lack of e-commerce skills in the workforce. ANTA has an opportunity to stimulate and guide the expansion of e-commerce training to overcome this impediment.

Rationale for selecting some industries for early attention

The NOIE research on e-commerce provides ANTA with a transparent and defensible rationale for selecting some industries for early attention, with regard to the development of e-commerce competencies. NOIE's research has identified a number of industries that will be most affected by e-commerce, although in some cases, the effects of e-commerce on a particular industry may be negative, for a period.

Table 2.4: Industries identified by NOIE in *E-commerce - beyond 2000 (Nov 1999)* as being affected most by e-commerce

Industries identified by NOIE
Entertainment and Hospitality
Transport
Communication
Banking and Finance
Education
Health
Food products
Other manufacturing
IT and other equipment
Transport equipment
Business Services
Wholesale and retail trade

ANTA may prefer to use the NOIE categories of industries in relation to developing competencies for e-commerce, rather than trying to fit the ITAB categories to the NOIE categories. If ANTA chooses the NOIE categories, various ITABs will need to be asked to work collaboratively on the one project: for example, CREATE and Tourism Training Australia might be asked to work together on the NOIE industry grouping of

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'Entertainment and Hospitality'. Also CREATE might be asked to collaborate with IT&T due to CREATE's involvement with multimedia and web design. The National Printing Industry Training Council (NPITC) may also be asked to work with IT&T and CREATE, given the NPITC's involvement in digital publishing.

A group of six industry clusters could be focused on in the first year of developing competencies in e-commerce. By restricting the number of industry sectors to six, it will be possible to develop good practices which can then be extended to the other industries and ITABs in the second year of the proposed project.

It is recommended that the NOIE industry research be used as the primary rationale for the selection of the six industry groups. Hence, the six industry sectors could include:

- information technology and telecommunications — to provide the technical competencies for e-commerce
- business services — because of its focus on core e-commerce processes such as marketing and selling.

The selection of the remaining four industry sectors could be based on a number of criteria, such as NOIE research data identifying those industries most likely to be positively affected by e-commerce. In the case studies released in early 2000 as part of the NOIE report *E-commerce - beyond 2000*, the sectors that were viewed as 'intensive users or rapid adopters of e-commerce' were Banking and Finance, Information Technology, Communications, Business Services, Health, Retail and Media and Entertainment. Hence, the following areas could also be involved in the first year of the e-commerce project:

- tourism and hospitality — as part of the entertainment-media industry
- banking and finance
- retail
- health.

The other industry sectors could be involved in the second year.

An alternative to selecting industries is to ask for expressions of interest from the range of relevant ITABs. The criteria for selecting appropriate ITABs could include:

- the interest in e-commerce shown by the ITAB
- the extent of work already undertaken in e-commerce within the ITAB and the industry
- industry support for the work with e-commerce and the NTF.

3. Findings from the interviews and consultations with industry

Summary

The consultations for this study confirmed that e-commerce is having a pervasive impact on many industries and that new skills are required immediately. In many cases, e-commerce will change the way business is conducted, particularly with an Internet-based supply chain. While IT technical competencies are required for e-commerce, all industries will need to develop e-commerce competencies, not just the IT&T industry.

The consultations also revealed that the field of competency standards is somewhat contentious. Additionally, e-commerce is controversial due to the desire of some ITABs to have a degree of control over this new phenomenon.

Context

The next three sections of this report provide a rationale for commencing the development of a range of e-commerce competencies and qualifications within the NTF and the development of related materials. The rationale for the development of e-commerce competency areas is provided by:

- the findings from the interviews and consultations with industry representatives and training providers for this study *(Section Three)*
- an analysis of new and emerging courses in e-commerce in Australia *(Section Four)*
- an initial discussion of competencies and qualifications needed to support e-commerce *(Section Five)*.

Methodologies

The interviews and consultations with industry with regard to e-commerce and its impact on training, consisted of a number of strategies:

- a briefing paper on e-commerce was circulated to all ITABs and Recognised Bodies in November 1999 for background reading
- workshops on the project were conducted for representatives from 15 ITABs and Recognised Bodies in Melbourne and Sydney on 15-16 November 1999
- follow-up interviews were conducted with ITABs and Recognised Bodies in December 1999 -January 2000

- interviews were conducted with a wide spectrum of industry representatives from small, medium and large businesses in December 1999 - January 2000
- an options paper was prepared in December 1999, identifying a range of options for managing the issue of e-commerce and its impact on training, and the options formed the basis of discussions with a range of industry representatives.

Consultations with Industry

Around 100 interviews were conducted for this study with representatives from a range of industries and organisations. The full list of interviewees is provided in Appendix 1. The cross-section of organisations involved was as follows:

- medium-large corporations included Oracle, Novell, EDS, Telstra, Aspect Computing, Icon Recruitment and the CSIRO
- other companies actively engaged in e-commerce included Sausage Software, 131Shop, Keycorp, Adacel and SCITEC
- e-commerce training providers included EDUCOM, Dow Digital, NSW TAFE and Logan Institute of TAFE, as well as individual trainers
- associations included the Council of Small Business of Australia (COSBOA), Australian Retailers Association, Australian Information Industries Association (AIIA), Australian Chamber of Commerce and Industry (ACCI), Service Providers Industry Association (SPAN) and the Australian Computer Society (ACS)
- Government agencies included the National Office for the Information Economy, ANTA, TAFE SA, Office of Post Compulsory Education Victoria and the Office of Vocational Education and Training Tasmania
- small businesses included real estate, wholesale distribution, seafood retailing and information technology.

The interviewees also included representatives from metropolitan, regional and rural areas.

Themes from key interviews

A number of key interviewees summarised the themes emerging from this report. For example, the following excerpt from an interview with Mr Phil Kiely, Managing Director, Oracle, sums up a number of themes:

- e-commerce is having a pervasive impact on many industries and new skills are required immediately
- in many cases, e-commerce will change the way business is conducted, particularly with an Internet-based supply chain
- new business models will be required for e-commerce

- while IT technical competencies are required for e-commerce, all industries will need to develop e-commerce competencies.

Notes from an interview for this study with Mr. Phil Kiely, Managing Director, Oracle, 13 January 2000

ANTA and all the ITABs need to understand the impact of e-commerce, as it affects all industries. New skill sets are needed within all industries. The modus operandi and business models in all industries will be re-invented because of e-commerce. For example, distribution models will change. Lou Gerstner, head of IBM, said recently the emerging dot.com companies will be mere fireflies in the face of the storm, when businesses move their supply chains to the Internet. Ford Motor Company's use of Oracle for AutoExchange is the first major example of this global supply chain, where all suppliers will deal with Ford over the Net. Jack Welch, head of GE, has said that if you want to deal with GE it has to be over the Net. All industries need to think through the ramifications of the Internet supply chain on businesses. Given the ease of access to information over the Internet, companies need to think about how can it change their business model, improve their competitiveness and increase their market share.

E-commerce is not just technical training. Technical competencies in e-commerce can be defined by the IT&T ITAB. Other ITABs need to consider competencies in e-commerce. They need to consider the changing business models, resulting from the new supply chains in business. These companies need technical competencies in their IT staff, but they need to know how to manage and market in these new areas.

ANTA should be an e-business: it needs to show others how to do it. The IT&T ITAB needs to be turned into an e-business.

Industry specific accredited qualifications in e-commerce are a great way to go. It is difficult to see generic e-commerce qualifications: they need to be defined industry-by-industry.

An e-commerce steering committee (of prominent people) overseeing all the ITABs (with a neutral project manager) will help ITABs understand why e-commerce is so important and why it has momentum. If you leave it to each ITAB, e-commerce will become fragmented

During his interview, Mr Phil Kiely suggested that ANTA develop an e-commerce plan for its own operation. Such an initiative would indicate to the rest of the VET community the seriousness of ANTA about providing leadership in this field. Preparation of the ANTA e-commerce business plan could include developing a vision statement for e-commerce, including the provision of new services to the needs of ANTA's clients; reviewing staff roles and resource allocation in terms of the e-vision; and identifying more markets that can be reached, using e-commerce, and developing a plan for each market. As this topic of an e-commerce plan for ANTA falls outside the scope of this study of e-commerce training needs, the above points are tabled for internal consideration by ANTA. An ANTA program was recently analysed in the report 'Framing the Future: an e-commerce operation' (1999). The report provides some possible directions for ANTA to review its own electronic communication processes.

In the following notes from an interview, Ms Judith Maddocks, National Business Manager, Telstra Learning, emphasises the need for Australia to develop a national strategy for e-commerce. The strategy will not only involve retraining and change

management in the workplace, but will include a marketing strategy to persuade customers to adopt e-commerce practices, so they can benefit from e-commerce.

Notes from an interview for this study with Ms Judith Maddocks, National Business Manager, Telstra Learning, 28 January 2000

The changes due to e-commerce are quite mammoth. It is totally challenging the way we do business and the relationships between buyers and sellers. I'm not sure if all the impacts are understood yet. There will be big winners and losers. We could get it awfully wrong if we are not clear about what we are trying to achieve. We have to look at e-commerce as a national issue which industry needs to drive, and it must be linked with the overall strategy of where this country is positioning itself in world markets.

At Telstra, one of the impacts of e-commerce may be major retraining or our staff. We will need higher order IT skills. We are looking for creators of e-commerce solutions, who can work in a team of problem solving people. People with a broad range of skills including IT, business and/ or sales expertise.

E-commerce will bring about a change in the relationship with customers with the removal of the middle man. Training employees is not the only answer. We need to work with our customers, so they can optimize their options using e-commerce. Currently, we only have 25% of Australian using the Internet – the early adopters. We need a marketing/education strategy to assist the rest of the population to understand e-commerce.

There will be a change management issues right across the country. E-commerce will bring a wholesale change in relationships. There are now new ways of doing business and the business tools are different.

Mr David Edwards, Executive Director, Australian Society of Certified Practising Accountants, has identified the need for e-commerce skills throughout organisations, not just in the IT departments. In the following quotation he also emphasises the importance of business-to-business e-commerce.

Notes from an interview for this study with Mr David Edwards, Executive Director, Australian Society of Certified Practising Accountants, 19 January 2000

Increasingly we will be seeing business-to-business (B2B) transactions running at a faster rate than business-to-consumer. All the evidence suggests that B2B is picking up exponentially.

The initial changes businesses made with e-commerce were to transfer existing, traditional business processes to the electronic medium. If you are doing business electronically, you are doing business differently, and there are different skills and competencies required. It is not just a matter of transferring conventional skills to e-commerce. The capacity to undertake business electronically will be a core competency in the future.

Examples of new competencies being used are secretaries who also manage an organisation's web site and staff who provide electronic publishing.

Typically in the past people in organisations used an IT person to transform the business. E-commerce was initially run out of separate departments tied into the IT department. Now just about every department has a person responsible for e-commerce.

E-commerce is being picked up by small and nimble organisations and by large organisations. Sometimes e-commerce spreads through the whole of an existing organisation. E-businesses are businesses that did not exist before the Net was developed.

We absolutely need new qualifications in e-commerce, at different AQF levels. In some organisations, every member of staff will need e-commerce skills. In our organisation, many people have taught themselves aspects of e-commerce.

I support a national approach to e-commerce in the NTF. For e-commerce, we need to break down the silos of ITABs. For the national good, we don't want ITABs to do their own thing with e-commerce.

Comments below by Mr. John Ridge, President, Australian Computer Society, reinforce the comments made by Mr Phil Kiely, Ms Judith Maddocks and Mr David Edwards. As head of the Computer Society, Mr Ridge could have been expected to promote the primacy of IT with regard to training for e-commerce, but he clearly stresses that IT is an enabler or deliverer, and that other industries are the major users of e-commerce. He emphasises that business strategic planning should dictate to the IT Department what is wanted for e-commerce. He also underlines the need for new training competencies in non-IT industries.

Notes from an Interview for this study with Mr. John Ridge, President, Australian Computer Society, 12 January 2000

The impact of e-commerce is, and will continue to be, huge. I see e-commerce mainly as a business issue not an IT issue, with IT as the enabler or deliverer; for without users, IT is nothing. Some IT people lose sight of the bigger picture. The important issues are what does business want to achieve and how does IT fit in with the business strategic plan. Often things go off the rails when an IT strategic plan is completed without reference to the overall business strategic plan.

Everyone is hyping up e-commerce and companies are spending a lot of money on web sites and not all are seeing a return from that investment. The IT industry needs to be very careful. Business people are coming to us in the industry and asking us for the solutions. This is wrong as the business people need to be clear about their plans and objectives and to tell the IT people what they want.

E-commerce competencies need to be a blend of business and IT skills and this is a major issue for the IT industry to face. Business and marketing people need a vision of what they want, and they don't need to know how the back end of IT works. They need to know what attracts the customers and what is the mindset of the customers.

We as an industry need to identify the competencies required in e-commerce. If you looked at the existing IT and business qualification streams, put together, they could possibly make a new qualification in e-commerce.

E-commerce is a really hot area. We need people now in business who have an appropriate blend of business, marketing and technology competencies. There is a challenge to the training system to respond quickly to e-commerce. The trouble is that by the time the qualifications are developed, the horse will have bolted. What we need are some e-commerce competencies developed straight away.

Mr Cliff Smith, Managing Director, Novell Australasia supports the above comments in the following excerpt from an interview with him in January 2000. Mr Smith emphasises the breadth of e-commerce and the need to identify a range of competencies.

Notes from an Interview for this study with Mr Cliff Smith, Managing Director, Novell Australasia, 7 January 2000

The impact of e-commerce is enormous. Customers were holding off till the Y2K bug was over, but are now beginning to pick e-commerce up. E-commerce is having an increasing impact on the way we (Novell) do business, and we are looking at our partners to be electronic.

There are three different levels of training required for e-commerce: broadbased training at the awareness level, to understand the technology and how to apply it in the business environment; a detailed technical level on how to implement e-commerce and how to link the front and back office electronically, and content provision.

We are looking for employees with more business skills, who can interpret the technology for our customers in a non-technical way. Some of the competencies in e-commerce are cross-industry. E-commerce is essentially re-engineering businesses.

A single qualification in e-commerce is too broad. E-commerce is too pervasive. E-commerce or e-business has all sorts of competencies.

An E-commerce Task Force (to oversee the development of competencies in e-commerce in VET) is a good idea. Members could be drawn from individual ITABs.

While the above interviews define the parameters of e-commerce, recruiters for the IT industry are uniquely placed to identify training needs in e-commerce. For example, Mr Colin Westwood from Icon Recruitment in Parramatta, NSW, is closely involved in providing contract IT workers for many of the leading companies in Australia. He considers that there is a massive shortfall in staff who can contribute to the growth of e-commerce. In particular, there is a need for more staff who have certificates in Web development, graphic design and usability. Icon's research shows that more staff are needed with competencies in the following types of occupations: Development Engineer, Media Director, Media Designer, Content Engineer, Art Director, Remedy Support, Graphic Designer, Program Designer, Web Producer and Information Architect. Interestingly, Mr Westwood believes that there are many opportunities in these e-commerce areas for arts and psychology graduates to bring the necessary creativity to the web and to e-commerce.

The above interviews summarised a range of ideas presented by other interviewees and provide a strong justification for beginning to develop specific e-commerce competencies besides the specifically technical competencies.

Other findings from the interviews

Other findings from the interviews conducted with industry representatives are as follows:

- The Australian Chamber of Commerce and Industry has produced an extensive and exemplary policy statement on e-commerce, that provides valuable guidance for business.
- Training providers such as EDUCOM are noting a fast increasing level of demand for courses related to e-commerce.
- An example of how e-commerce is stretching the boundaries of the existing Training Packages is in the area of web-based publishing, where a web-master design course ideally reaches across the Training Packages in printing, multimedia and information technology. 'There is a convergence of design skills with IT skills' (Mr Andrew McGowan, TAFE SA).
- E-commerce training is required not just for those who will deliver the training, but for the customers. 'We need cultural teaching for customers on how to go online to order milk from a shop' (Mr Awadh Pandey, Sausage Software).
- IT companies can provide the hardware and software, and often can provide a solution that requires minimal interpretation by the business buying the application. However, the business buying the application still needs a strategic plan and marketing plan which includes e-commerce . These businesses also need new competencies to optimise the benefits of the e-commerce technology.
- In the retail field, new e-commerce competencies are needed in relation to using a website instead of a printed catalogue; fulfilling orders placed online; using the new online supply chain, online customer service; and using and maintaining online customer databases. 'Technical experts take charge of e-commerce in retailing and don't understand the retailing process' (Mr Bill Healy, Australian Retailers Association of NSW).
- An interesting example of e-commerce in the meat industry was provided by Mr Clive Richardson, Field Officer, Meat Industry Advisory Council. Japanese buyers are e-mailing photographs of cattle rumps to buyers in Wagga Wagga where the photographs display the muscle groups required, and the muscle the buyers want trimmed off. The new development of electronic tagging of all cattle means that buyers will be able to access a beast's history electronically. Mr Richardson believes that this development will lead to the demise of traditional sale yards, and that in future, abattoirs will buy from cattle producers electronically. Elders' Computer Aided Livestock Marketing is a demonstration of this trend.
- Mr Richard Santo from Aldacel reports that the company calls their specialist staff in e-commerce 'business engineers', not just software engineers, as the staff need to understand their customers' strategic business directions.
- A number of banks have developed high-level skills in e-commerce, but commercial rivalry prevents them from sharing the knowledge of competencies they have developed.

The comments above illustrate the breadth of the impacts of e-commerce and the need

for new competencies to take advantage of this development.

Feedback from consultations and workshops with ITABs

The range of issues raised by ITABs during the consultations included the following:

- the competency model is being challenged by those who argue that competency standards don't measure productivity or quality, so the development of e-commerce standards may also meet with some criticism
- a separate Training Package on e-commerce is unlikely to be approved by the National Training Framework Committee
- the present e-commerce study overlaps with a review of the Key Competencies
- a question to address is whether e-commerce exists as a set of competencies in its own right
- the development of e-commerce competency units will need to take into consideration the work of the Commonwealth Government's IT&T Skills Task Force
- e-commerce competencies are urgently needed in the current fast-changing business environment, for example in the banking and transport industries
- e-commerce reflects the speed of change in contemporary business and involves the development of new models of business
- a number of ITABs believe they have special place with regard to e-commerce, including IT&T, Business Services, Utilities and CREATE
- a temporary bridge may need to be built in terms of e-commerce competency units, to enable e-commerce training to be provided in a Just-in-Time fashion in critical industries
- there is a huge opportunity to engage the banks in the development of e-commerce competencies
- the IT&T ITAB and the Business Services ITAB propose that they should be given joint status to develop competencies in e-commerce
- the Utilities ITAB believes that e-commerce is a training issue not a competency issue
- e-commerce lends itself, in part, to knowledge units, which aren't normally approved
- a specialist qualification in business-to-business e-commerce may be important to develop, due to its economic importance, despite the higher public awareness of business-to-consumer e-commerce.

The above points illustrate that the field of competency standards is contentious and that e-commerce, in particular, is controversial, due to its current prominence in the media and the desire of some ITABs to have a degree of control over the issues.

Guideline Standards

Guideline Standards for e-commerce were a specific focus of some consultations with ITABs. The range of issues raised by ITABs during the consultations were as follows:

- Guideline Standards are new in the National Training Framework and any e-commerce Standards may not fit the existing models used for OH&S and Food Safety
- the status of Guideline Standards is very low in the ITAB arena, particularly as ITABs are not forced to use Guideline Standards. For example, many participants in the two workshops were unaware of the Food or the OH&S standards
- ITABs believe that the lack of ANTA funding to adopt Guideline Standards is a disincentive to take action
- e-commerce may require Guideline Standards to encapsulate emerging skills
- some ITABs may want to slow the development of e-commerce Guideline Standards due to other priorities and pressures on them
- if cross industry standards already exist in the IT&T and Business Services Training Packages, why are Guideline Standards required?
- the Hospitality ITAB representative believes that e-commerce is a funding issue, not a Guideline Standards issue
- the rate of development of Guideline Standards may vary between ITABs

E-commerce raises the matter of the legitimacy, appropriateness and versatility of Guideline Standards. These issues are discussed in more depth in Section Seven of this report.

Summary of issues related to the development of a project brief

Set out below is a summary of the ideas raised by the two e-commerce workshops conducted in Melbourne and Sydney on 15-16 November 1999 and during other consultations with industry in relation to the development of a project brief. The brief is set out in a separate document and outlines the necessary work to ensure that e-commerce standards and desirable qualifications are available within industry Training Packages or can be addressed within the National Training Framework. By using a number of strategies, the brief attempts to accommodate the various issues discussed below.

Table 3.1 Issues identified by ITABs in relation to the development of a project brief for e-commerce

	Issue	Elaboration
1.	*E-commerce raises a number of political, economic, community and policy issues which need to be clearly identified, to fully assess the impact of e-commerce on the National Training Framework (NTF*	For example, there is the need to encourage the use of e-commerce for the national good (see NOIE, October, 1999). Economic impacts of e-commerce have been detailed in *E-commerce - beyond 2000*. Community issues include equity, cost, access and privacy. Policy issues include how to stimulate the adoption of e-commerce nationally, not just in capital cities.
2.	*The impact of e-commerce on the NTF is more than the need to develop technical IT competencies.*	There are important non-technical dimensions of e-commerce such as the development of new business models and new ways of marketing and providing customer services.
3.	*E-commerce training needs can be expected to vary from group to group*	Different groups of learners, such as new entrants to VET who need a basic introduction to e-commerce and qualified people already in the workforce who have a need to understand e-commerce in a Just-in-Time manner, will require different e-commerce training services. These different dimensions of e-commerce will influence the organisation of the proposed brief. This finding about different groups or segments of learners is congruent with the findings from recent market research conducted for ANTA.
4.	*The impact of e-commerce on Training Packages will be in two broad categories: a technical and a business dimension.*	The technical dimension has been partly scoped in the OLS Report and the SmithComyn paper, but requires further scoping, particularly as both these reports were overseen by the InfoComP/IT&T ITAB and reflect an understandable bias towards the IT and Communications fields. The business dimension of e-commerce includes issues such as: • Business-to-business e-commerce • Business-to-consumer e-commerce • Reasons for the rise of e-commerce • Impact of e-commerce on industries • Impact of e-commerce on jobs • Impact of e-commerce on organisational structures • Old business models versus e-commerce business models • Consumer control and e-commerce • Role of Government in e-commerce

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- Creating new markets using e-commerce
- Disintermediation and re-intermediation
- Supply chain management and e-commerce
- E-commerce business strategies
- E-commerce marketing strategies
- Legal issues
- Confidentiality and privacy issues
- Value chains.

5. *The impact of e-commerce on Training Packages will vary from one Training Package to the next*

Priority packages which need to address e-commerce include IT&T, Business Services and CREATE. However, many other industries are finding e-commerce to be a fundamental new force: the NOIE report, *E-Australia.com.au* identified banking, tourism and hospitality, and transport. The report *E-commerce – beyond 2000* identified a range of industries that will be most affected by e-commerce. The Training Packages in these areas also need attention.

6. *The impact of e-commerce on Training Packages may vary from modifying some existing competencies, to developing some new ones*

In some instances, a new qualification could be developed; in other Training Packages, no new qualification might be introduced.

7. *Training Packages need to accommodate the fact that e-commerce will develop in different ways from one business to the next.*

For example, e-commerce can occur within any one business in one or more of the following forms:

- e-commerce can be an additional business activity for an existing business
- e-commerce can be the sole basis of a new company which delivers services not previously available
- e-commerce business practices can become diffused through an existing business.

8. *The impact of e-commerce on industry is so pervasive, that incorporation of e-commerce Guideline Standards could become part of any future review of Training Packages.*

This would be more appropriate for those Training Packages which did not need immediate attention in relation to e-commerce competencies.

9. *The impact of e-commerce on industry is so fundamental for the Australian economy (NOIE report, November 1999), that multiple strategies are required to ensure that appropriate qualifications are created and training*

Strategies could include the development of competencies in many Training Packages and the development of non-endorsed support materials.

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	is provided.	
10.	*The understanding of e-commerce can be expected to vary, not only from one ITAB to the next, but across the community.*	The vocational education and training community will need to be educated about the importance of e-commerce, by being exposed to e-commerce in a non-threatening way, and on an ongoing basis.
11.	*E-commerce can be expected to keep changing due to the continual development of new technologies, new business models and new applications*	Accommodating such a continually changing development within Training Packages will be a difficult but necessary task.

The above points demonstrate the need for a range of strategies to be proposed in the project brief which will outline the necessary work to ensure that e-commerce standards and desirable qualifications are available within industry Training Packages. The brief will also need to identify priority actions as well as actions which could be taken in a second stage.

The initial consultations and workshops also highlighted the breadth and complexities of the issues related to the impact of e-commerce on industry. The discussions revealed that the topic of e-commerce provokes wide-ranging reactions about emotional issues such as job losses, privacy fears, the loss of banks from towns and consumer resistance to providing credit card numbers over the Internet. Consumers need for skills in order to benefit from e-commerce and for protection of their privacy. On the other hand, e-commerce is capturing the interest of many industries and currently is the focus of extensive media attention, so the pressure on ANTA for training in e-commerce can be expected to grow.

The consultations and workshops also revealed that different ITABs respond differently to e-commerce and have different levels of knowledge on the topic. Hence, there is an ongoing need to both consult with and to quickly educate ITABs and Recognised Bodies and industry about the potential training needs in e-commerce.

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4. Analysis of new and emerging e-commerce training courses in Australia

Summary

The e-commerce training courses summarised in this section show that e-commerce is a suitable focus for a range of targeted training groups and for different qualifications. These findings support the development of both individual competencies and sets of competencies in e-commerce, and where appropriate, qualifications in e-commerce.

Introduction

This section sets out a range of e-commerce training courses currently available or being developed in Australia. The volume of such courses is low, and the following set of courses represents a large proportion of current activity. However, a number of interviewees for this study indicated that there was strong public demand for specifically e-commerce courses, so we can expect a proliferation of such courses in the near future.

The sample of providers represented below covers:

- a private provider, EDUCOM Australia Pty Ltd
- public TAFE providers, QLD and NSW TAFE
- a public provider sponsored by all Governments, AUSe.Net
- a university, Charles Sturt University.

Vendors such as Novell and Microsoft also provide certified training courses relevant to e-commerce, but as these types of courses are often provided on licence by trainers such as EDUCOM, they are not discussed separately in the following discussion.

The e-commerce courses offered by the range of providers discussed in this section target the following segments of the training market: small and medium sized businesses (SME); technical staff such as network server administrators, firewall administrators, systems administrators, application developers, IT security officers and Webmasters; IT professionals re-skilling, and new students. The courses range from awareness raising activities, to Diploma, Graduate Certificate and Masters degree levels. In summary, the courses listed below show that e-commerce is suitable for a range of target groups and e-commerce is relevant at different qualification levels.

The following discussion also shows that sometimes an aspect of e-commerce, such as security issues, is appropriate as a stand-alone module. Sometimes e-commerce modules are appropriate as a stream within an existing qualification. Finally, sets of e-commerce modules are sometimes deserving of a wholly new qualification.

These findings about e-commerce training courses are congruent with the findings set out elsewhere in this report from other research and consultations. These findings support a major recommendation of this study — that both individual and sets of competencies in e-commerce be developed, and where appropriate, that qualifications in e-commerce be developed.

The training courses described in this section also demonstrate other key findings from the research:

- that e-commerce involves both the information technology that enables it, and the business principles that underpin it
- that e-commerce is increasing the scope of some existing occupations and is creating some new occupations
- that e-commerce is impacting on a wide range of industries, from retailing to transport, to banking and finance.

Few of the courses described below are constructed around competencies. Rather, they are normally constructed around the traditional curriculum model of course content, with topics and themes. However, the courses indicate a range of areas where competencies could be developed.

1. EDUCOM Australia Pty Ltd

EDUCOM Australia Pty Ltd is a vendor-independent organisation that provides training in technical, computer and human resource areas. EDUCOM has offices in North Sydney, Melbourne and Canberra, and currently provides instructor-led training.

EDUCOM offers a number of e-commerce related courses, including:

- Basic Internet Business Fundamentals, a one-day course
- Certified Internet Webmaster program, a two-level course, starting with Foundations and then enabling the student to select one of the following four streams: Site Design, Internetworking, Security and E-commerce.

Features of both the Fundamentals course and the E-commerce stream from the CIW program are set out in the table below.

Table 4.1: Features of the EDUCOM courses in e-commerce

EDUCOM courses	Brief Description*
1. Basic Internet Business Fundamentals	This course teaches new users how to access the Internet, including e-mail, WWW, newsgroups, Gopher, Veronica, File Transfer Protocol and Telnet. Students use browsers and learn about business on the Internet and how business research can help companies gain market intelligence.

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2. CIW E-commerce stream	This stream focuses on standards, technologies and practices in electronic commerce. The student examines the relationships among cardholders, issuers, merchants, acquirers, payment gateways and third parties through the use of Secure Electronic Transactions (SET), cryptography standards, Certificate Authorities, and services such as VeriSign and CyberCash. The target audience for this track includes network server administrators, firewall administrators, systems administrators, application developers, IT security officers and Webmasters.

* Source: http//:www.educom.com.au/courses/ciw/ecommerce.htm

2. Internet and Business Training Centre, Logan Institute of TAFE

The Internet and Business Training Centre at the Logan Institute of TAFE in Brisbane regularly conducts short courses for small businesses on 'Creating and Running a Business on the Internet'. The target group includes small business owners, managers and staff. The courses demonstrate that the Internet is an extension of current business, and can provide better internal and external customer support through improved efficiencies in communication.

In the courses, participants are encouraged to develop a business plan that will influence the decisions made about the design of the web site. The courses also examine the marketing aspects of a web site. The technical content of the courses includes: Internet Awareness; E-mail; Browsers; Search Engines; and Building Web Sites.

Logan Institute of TAFE conducted one of five e-commerce projects as part of the DETYA funded Small Business Professional Development program, from mid-1999 to February 2000. The projects are managed by the Office of Vocational Education and Training in Tasmania, and are being evaluated by John Mitchell & Associates. The six projects are focused on the development of business and marketing plans as the precursor to developing e-commerce.

3. Business Services, Educational Services Division, NSW Department of TAFE

The Business Services section of the Educational Services Division, NSW Department of TAFE has written three introductory modules on e-commerce, designed for the lower AQF Certificate levels, as follows:

- *An Introduction to E-commerce:* a 5-hour module which addresses key questions such as: What is e-commerce, E-banking, E-trading, E-catalogues? The module also examines emerging e-business trends.
- *E-Banking:* a 10-hour module which examines many of the effective e-banking sites and considers the advantages of e-banking, such as enabling businesses to monitor their cash flow.

- *E-Trading*: a 20-hour module which looks at retailing on the Net including issues such as using e-catalogues.

These three introductory modules have been incorporated into a Certificate II in Computer Applications for Office. These modules can also be delivered on their own, and not as part of a course; or they can be incorporated into other courses/programs, such as marketing, retail, finance, etc.

The developer is now turning her attention to putting forth a proposal to the State ITAB in NSW, FINBUS, for a two-stage project – for the research followed by the development of e-commerce courses aimed at the higher end of the AQF. A possible course would be a 240-260 hour Graduate Certificate in E-Business. (The content of the course may be different to the current proposal following the research phase).

Table 4.2: Outline of possible TAFE NSW Graduate Certificate in E-Business*

Core: –

- E-Commerce (an overview module including emerging E-Business trends)
- Workflow and Business Process Re-engineering
- Business technology module (Internet, security, etc.)
- Major Project

Strands:

- E-Banking and Finance
- E-Trading and Retail
- E-Marketing and Logistics
- Human Resources
- Information Technology

The proposed course is seen as providing high-level skills, both broad and specific, necessary to establish and maintain a successful electronic business.

Learners who have completed the TAFE NSW Statement of Attainment in Electronic Commerce (3680) will be eligible for Advanced Standing into the Technology Strand of this course.

Assessment will be through work-based projects including a major project. For participants who do not have access to the workplace, assessment will be through case study and projects, including a major project.

Duration: Approximately 240-260 hours

Articulation arrangements will be negotiated with the University of Technology Sydney, Charles Sturt University, and Monash University in relation to into their undergraduate and postgraduate courses in Business and in Information Technology.

In this emerging electronic era, businesses need to ensure that workflow patterns are formalised and built into the controls of software systems to enable new and distributed ways of undertaking work. In these emerging models of virtual organisations and widely distributed business processes, workflow analysis is required for the rationalisation of cumbersome, manual procedures, simplification and codification of decision-making, automation of record-keeping and substantially greater control.

Delivery: Ideally, delivery on-line; or mixed-mode including some face-to-face delivery.

Other relevant projects: Practice Firms or Simulated Businesses

The Australian Network of Practice Firms (ANPF) is developing a simulated website for student use

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where students simulate business activities using web sites, providing catalogues online, banking online and trade online.

The Australian Network of Practice Firms (ANPF) is a web of vocational training environments that use simulated businesses as a means of integrating, refining, exploring and adapting business processes and transactions. ANPF provides a safe and secure learning environment for students to develop skills and to experience the world of business by simulating a virtual economy very similar to the Australian small business economy.

*Source: Interviews with Jeannine Angilley, 18 December 1999; 19 January 2000

4. IT & Arts Media, Educational Services Division, NSW Department of TAFE

The IT & Arts Media, Educational Services Division, NSW Department of TAFE is currently developing materials for three separate initiatives in e-commerce:

- a series of half-day workshops on e-commerce to be offered on a fee-for-service basis. The seminars are described in the table below.
- short courses in e-commerce amounting to 120 hours at the post-graduate level, designed for the IT professional re-skilling for e-commerce, as described below.
- a Graduate Certificate in e-commerce of 260 hours, as described below.

The series of seminars described in the table below would use many of the valuable, available resources, such as publications from NOIE.

Table 4.3: Proposed e-commerce seminars

Seminar Title	Brief Description
1. Overview of E-commerce	The half-day course seminar will include a look at Yahoo Store, which enables the user to set up an e-commerce site on the Internet.
2. Getting Paid on the Internet	This seminar will use the NOIE publication on this topic, and other materials produced by AIIA and ABA.
3. An Introduction to Smart Cards	This seminar will use TAFE NSW as the major case study, as TAFE is introducing an electronic smart card for students. The seminar would show why students should use the smart card.
4. Researching on the Internet	This seminar will examine an advanced level of searching for information on the Net.
5. Banking on the Internet	This seminar will be based on the NOIE publication on this topic.

The second initiative in e-commerce from the IT & Arts Media involves the development of short courses that have been designed as a result of focus group

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discussions with industry. Aimed at the IT professional who is re-skilling for the advent of e-commerce, a prerequisite for this course will be a Diploma in Web Site Production and Management. The course will be 120 hours and will consist of a module on E-commerce Fundamentals and more specialised modules on Site Server Tools, Security, IT Systems Re-engineering and Integration.

The third e-commerce course being planned will be at the Graduate Certificate level and will include the 120 hours of short courses described above as well as units on:

- Advanced Online Security
- Advanced Process Re-engineering
- Online Databases.

The Graduate Certificate will be assessed by a project that will require the student to build an e-commerce Internet site. The latter course has been funded for development for NSW TAFE's Online network, with the lead agent the North Coast Institute of TAFE.

Source: Communications with Agnes Vukovic, TAFE NSW, 16 December 1999, 12 January 2000

5. AUSe.NET

The Australian Electronic Business Network (AUSe.NET), is an independent, not-for-profit organisation established by the Commonwealth, State and Territory Governments in Australia, in partnership with industry, to encourage the use of electronic commerce among Australia's small to medium sized enterprises (SMEs). This will be achieved through a combination of training and awareness programs; access to web-based information resources; and the demonstration and piloting of electronic commerce systems and solutions.

Through 1999 and into 2000, AUSe.NET is progressively establishing a national network of Business Partners who will deliver the AUSe.NET workshops to SMEs across Australia. This network will include Chambers of Commerce and Industry, Industry Associations, Universities, TAFEs and training and electronic consultancy service providers from the private and public sector.

AUSe.NET products and services for SMEs are presented in a vendor-neutral, non-proprietary and independent form. AUSe.NET workshops will provide SMEs with a set of business decision support tools to enable them to take the first steps into electronic commerce. The primary services will include generic and industry specific workshops that will deliver value through:

- raising awareness of electronic commerce;
- identifying business applications and benefits; and
- identifying implementation issues.

AUSe.NET workshops take the form of three-hour business improvement workshops, developed specifically to help SMEs understand the "why" of electronic commence,

rather than the "how", with which they are inundated and find confusing. The AUSe.NET workshops have been designed for those with no knowledge of computers to take the first steps into the digital world. They also take those, already with some knowledge of the practical applications of electronic commerce, to be able to frame their business decisions and build action plans to take advantage of the benefits of trading electronically alongside traditional methods.

Following attendance at AUSe.NET workshops, SMEs will have access to the AUSe.NET online services on the web site at www. AUSe.NET. There, they will have access to a wide variety of service providers who can help them with the extra skills and assistance that they will need on their electronic commerce journeys, and information on developing applications and trends in electronic commerce.

Source: AUSe.NET Information Kit, www.ause.net

6. University: Charles Sturt University

Charles Sturt University offers Electronic Commerce units within its Masters Degree in Business Administration (MBA). Candidates can take up to 4 units in Electronic Commerce, towards the 12 units required to complete the MBA.

The aim of the Electronic Commerce Stream is to equip students 'with knowledge, understanding and strategies to enable them to conduct business across the Net'. (CSU MBA course guide, p.32). The course is a response to the need for managers in private and public organisations to be aware of the technical, accounting, auditing and legal ramifications of conducting business in the digital environment' (p.32). The units are set out in the following table.

Table 4.4: MBA units in e-commerce at Charles Sturt University

MBA Unit	Brief Description*
1. Commerce on the Information Highway	Provides an introduction to the Internet and the international computer information network. The emphasis is on making students competent users of the Internet.
2. Digital Communities	Legal strategies for conducting business across the Internet are explored in this subject. Managers need to be informed about the law of contracts, copyright, privacy, security, payment systems, taxation, domain names, defamation and dispute resolution. The notion of digital communities is critically examined as being a possible solution for dealing with legal problems when trading across the Net.
3. Security, Control and Business Information Systems	This subject introduces the use of computerised information systems, which record, summarise and report events from organisations' interactions with its social, political and economic environments. A detailed examination of management and systems management is undertaken. Control and audit processes in electronic commerce are also explored.
4. Modelling for Business Support	This subject provides a practical introduction to the theory and practice of decision support systems for use in management.

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research or decision making. Major topics include modelling, prediction, optimisation, problem solving, visualisation and the design of user interfaces to facilitate the presentation of critical information.

* Source: (CSU 1999 MBA course guide, p.32)

Discussion

As indicated earlier, the courses summarised in this section show that e-commerce is suitable for a range of targeted training groups and is relevant at different qualification levels. These findings support the development of both individual and sets of competencies in e-commerce, and where appropriate, qualifications in e-commerce.

The above descriptions also indicate that:

- the numbers and types of these courses on e-commerce in Australia can be expected to proliferate in the near future
- there will be considerable variations in the content, quality and style of these e-commerce courses
- the current courses are normally of the generic type, aimed at the beginner, or IT-based
- the current courses are mostly designed by providers using a traditional curriculum model, are knowledge-based and are not based on a competency-based model derived from industry consultation
- there is considerable scope available for ITABs to use the performance appraisal approach, where the use of e-commerce is defined, then to define competencies
- there is an opportunity for ANTA to show leadership by providing guidance and funding support in the development of e-commerce competencies and qualifications.

5. Possible e-commerce competencies and qualifications

Summary

This section provides a collation of possible e-commerce competencies, arising from this study, which may be useful in the next phase of the ANTA e-commerce project.

Background

The possible e-commerce competencies set out in this section are drawn from a number of sources:

- the literature on e-commerce
- the range of ideas raised in Sections One-Three
- the sample of courses discussed in the previous section of this report.

E-commerce components and concepts, extrapolated from section one

Section One introduced a number of key concepts in e-commerce:

- business-to-business e-commerce
- business-to-consumer e-commerce
- disintermediation
- re-intermediation
- Extranet gateways
- supply chain management
- buying, selling and exchanging products, services and information via computer networks
- inter-company and intra-company electronic functions of marketing, finance, manufacturing, selling and negotiation.

The development of competencies in relation to the above concepts is fundamental to the use of e-commerce.

Section One of this report also mentioned the following opportunities provided by e-commerce:

- more efficient payment systems
- more efficient customer support
- lowering of production costs
- reductions in inventory
- expansion of market reach
- increased speed to market
- value-added chains
- changes in international competitiveness
- new products and ways of doing things
- changes in export patterns.

Each of these concepts will need to be considered when designing competencies in e-commerce.

Additionally, Section One referred to:

- the development of business plans and models in e-commerce
- the development of marketing plans in e-commerce
- partial and pure digitisation of products and services
- the electronic delivery of information, products and services
- automating business transactions and work flows
- transferring electronic funds
- using smart cards and digital cash.

Again, each of these business skills and processes will need to be analysed in order to develop competencies for e-commerce.

E-commerce components and concepts, extrapolated from existing courses

An analysis of the courses discussed in the previous section suggests that many of the new courses on e-commerce focus first on introducing users to the Internet, including how to use email, the www, newsgroups, file transfer protocol and how to undertake basic Internet research. A second focus is on different types of business models for the Internet, such as e-banking, e-trading and e-catalogues. The third focus is on business planning and marketing plans in relation to e-commerce. The above three foci are the normal components of an induction course on e-commerce.

The fourth major focus of e-commerce courses is often on technical issues, particularly *standards, technologies and practices in electronic commerce. Topics include the* relationships among cardholders, issuers, merchants, acquirers, payment gateways, and third parties through the use of Secure Electronic Transactions (SET), cryptography standards, Certificate Authorities.

A fifth focus of e-commerce courses is to examine how the organisation needs to change its various functions such as human relations, logistics and accounting, to suit the electronic communication medium. In some cases, this is called process re-engineering.

A sixth focus is on online databases and how information can be better managed within the organisation. This involves the use of computerised information systems, which record, summarise and report events from organisations' interactions with their social, political and economic environments.

A seventh focus is on legal strategies for conducting business across the Internet. This can involve the law of contracts, copyright, privacy, security, payment systems, taxation, domain names, defamation and dispute resolution.

An eighth focus is on the theory and practice of decision support systems for use in management, research or decision making. Topics include modelling, prediction, optimisation, problem solving, visualisation and the design of user interfaces to facilitate the presentation of critical information.

A deeper analysis of the components and concepts of e-commerce

Most current courses on e-commerce are pitched at the introductory or awareness-raising level, which may suggest to some e-commerce students that the field is straightforward. This is a misconception, as a deeper analysis of the components and concepts of e-commerce reveals the complex nature of the subject. Authors such as Kalakota and Whinston (1997), Evans, P.B. & Wurster, T.S. (1997), Lawrence et al (1998), Tapscott, D. (ed.) (1999), Timmers (1999) and Turban et al (2000) provide a deeper analysis. For instance, Turban et al (2000) remind us that e-commerce is based on at least ten knowledge disciplines.

Table 5.1: Disciplines underpinning e-commerce (adapted from Turban et al, 2000, pp.13-14)

Discipline	Description
1. Marketing	Some marketing issues are unique to e-commerce, such as he use of interactive kiosks and banner advertisements on web sites.
2. Computer sciences	Intelligent agents are just one of the many computer science issues involved in e-commerce.
3. Consumer behaviour and psychology	The web provides new challenges for psychologists analysing buyer and seller behaviour.
4. Finance	Using the web for stock exchange and battling fraud on the Net

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	are two common issues in e-commerce.
5. Economics	Theories of microeconomics need to be considered when planning an e-commerce business.
6. Management information systems	Issues involved in e-commerce include systems analysis, systems integration and security.
7. Accounting and auditing	The back office operations required for electronic transactions are similar in some ways and different in others to conventional operations.
8. Management	Because of the unique mix of disciplines in e-commerce, its management requires new approaches and theories.
9. Business Law and ethics	Many bills are needed for the e-commerce environment and ethical issues such as privacy and intellectual property need to be addressed.
10. Other	Other disciplines playing a lesser role include statistics, robotics, sensory systems and administration.

It is worth noting that 'technical' aspects of e-commerce are very much in the minority in the list above, confirming a theme of this report that e-commerce is primarily a business issue, not an IT issue.

Any one of the above ten areas could be analysed in some depth. If just the marketing issue is analysed, the complexities and challenges of the e-commerce environment become obvious, as demonstrated in the following table from Turban et al (2000).

Table 5.2: Marketing shift from marketplace to marketspace (From Turban et al, 2000, p. 27)

Shift from	To
Mass marketing and advertisement	Targeted, one-to-one interactive marketing and advertisement
Mass production	Mass customisation
Monologue	Dialogue
Paper catalogue	Electronic catalogue
One-to-many communication model	Many-to-many
Supply-side thinking	Demand-side thinking
Customer as a target	Customer as a partner
Segmentation	Communities

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Physical products and services	Digital products and services
Branding, megabrand	Communication, diversity
Intermediation	Disintermediation, re-intermediation

The above concepts show that e-commerce requires more than an understanding of conventional marketing theory. E-commerce provides some unique challenges for marketers which cannot be addressed using conventional theory. A similar analysis could be made of other fields involved in e-commerce, such as management, law, economics and psychology, with the same finding: some aspects of e-commerce require new thinking.

Sample competency areas in e-commerce

The following table provides samples of competency areas arising from this study.

Table 5.3: Sample e-commerce competency areas arising from this study

Sample E-commerce Competency Areas
1. Use the Internet
2. Use the Internet to research business information
3. Buy and sell online
4. Use the Internet to communicate in business
5. Provide online customers with control of their buying
6. Advertise online
7. Design an e-shop
8. Design an e-mail
9. Participate in an e-auction
10. Participate in a virtual community
11. Build your e-commerce site
12. Purchase supplies online
13. Develop your e-commerce business plan
14. Enable your customers to order online
15. Pay your bills online

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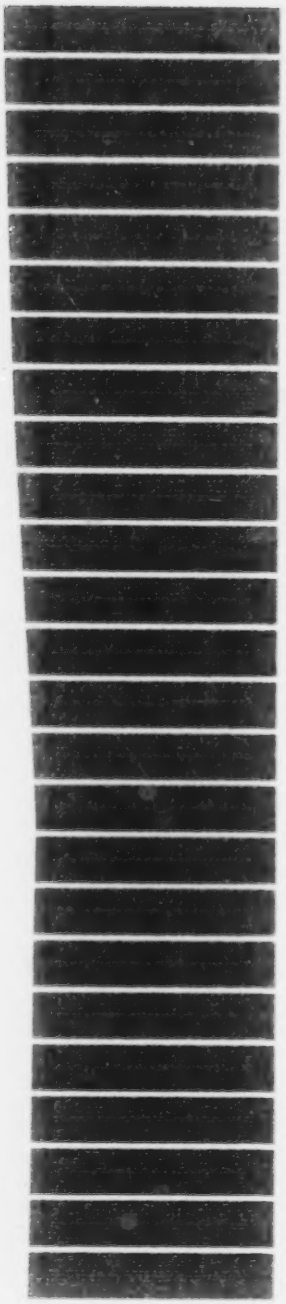
16. Monitor your inventory online
17. Participate in your industry's supply chain
18. Develop basic online customer support systems
19. Participate in a business Extranet
20. Market directly online
21. Conduct online market research
22. Create your e-commerce services
23. Develop an online database
24. Re-engineer your business for e-commerce
25. Undertake process re-engineering for e-commerce
26. Develop advanced online security
27. Implement electronic customer relations management
28. Develop computerised information systems
29. Develop a range of business models for e-business
30. Develop online strategies for customer intimacy
31. Market nationally and internationally online
32. Develop management systems in e-commerce
33. Develop control and audit processes in e-commerce
34. Develop legal strategies for conducting business online
35. Online decision support systems: modelling
36. Online decision support systems: optimisation
37. Online decision support systems: prediction
38. Online decision support systems: problem solving
39. Online decision support systems: visualisation
40. Online decision support systems: design of user interfaces



The list above is a sample only. A number of the above competency areas may already be covered by existing Training Packages.

An example of how just one of the above competency units can be sub-divided is

provided by Turban et al (2000) in relation to the area of conducting online market research.

Table 5.4: Sample competency areas for conducting market research online (adapted from Turban et al, 2000, p. 99)

Sample competency area	Sample competencies
1. Conducting online research	1. Define the research area and the target market
	2. Identify news groups and Internet communities to study
	3. Identify specific topics for discussion
	4. Subscribe to the pertinent groups and register in communities
	5. Search discussion group topic and content lists to find the target market
	6. Search e-mail discussion group lists
	7. Subscribe to filtering services that monitor groups
	8. Read FAQs and other instructions
	9. Enter chat rooms
2. Design the Research Instrument	10. Post strategic queries to groups
	11. Post surveys on your Web site. Offer rewards for participation
	12. Post strategic queries on your Web site
	13. Post relevant content to groups with a pointer to your Web site survey
	14. Post a detailed survey in special email questionnaires
	15. Create a chat room and try to build a community of consumers
3. Target the audience for the study	16. Compare your audience with the target population
	17. Determine your editorial focus
	18. Determine your content
	19. Determine what Web services to create for each type of audience

This single example demonstrates that many competencies could be identified within broad areas concerned with e-commerce such as marketing and management.

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Speculative comments about e-commerce qualifications

Based on the various sources used for this study, and having discussed these ideas only in very general terms with the relevant ITABs, it is possible to speculate about possible e-commerce qualifications that could be developed within the NTF. Due to the complex nature of e-commerce, it is expected that most of the qualifications would be at the higher end of the spectrum, particularly at the Diploma and Advanced Diploma levels. With the new trend of University graduates to seek vocationally orientated courses in VET, the opportunity arises to provide Graduate Certificate and Graduate Diploma qualifications in e-commerce.

Within the IT&T arena, there are strong possibilities for e-commerce qualifications, from the Diploma upwards, such as Diploma of Information Technology (E-commerce Technology). These qualifications could focus on competency areas such as developing online decision support systems, developing advanced online security, developing online databases and implementing an Extranet. Technical areas such as secure online systems and online databases are attracting increasing attention from researchers and integrators, such that it would not be unexpected to see the development of, say, an Advanced Diploma of Information Technology (E-commerce Security).

Within the Business Services area, there are also many possibilities for e-commerce qualifications from the Diploma level upwards, such as an Advanced Diploma in Business (E-commerce Marketing). Areas other than marketing which could attract higher level qualifications could include a Diploma in Business (E-commerce Data Management), Advanced Diploma in Business (E-commerce Business Administration), Advanced Diploma in Business (E-commerce Sales), Graduate Certificate in Business (E-commerce International Services) and a Graduate Diploma in Business (E-commerce Management Services). The Business Services area could also address many of the finer areas of e-commerce, such as developing a range of business models for different contexts (e.g. an e-shop, e-mall, e-brokering or e-auction business model).

Many of the other ITABs could develop a range of e-commerce qualifications. For example, tourism was identified by NOIE as the industry most likely to be affected by e-commerce in a positive way. Hence, one could imagine a Diploma in Tourism (E-commerce) which focused on tourism-related matters from an e-commerce perspective, such as using online databases for a range of purposes, marketing online, providing enhanced customer services online such as loyalty programs and developing Extranet processes for linking to a range of suppliers.

Another obvious area where early attention could be paid is retailing. An Advanced Diploma in Retailing (E-commerce) could include competencies related to e-commerce marketing, call centre strategies, online customer relations and business-to-business communication.

Two issues arise when considering such a range of qualifications. Firstly, standards related to areas such as online marketing or online customer services could be used in a wide range of Training Packages. Secondly, many of the non-IT&T qualifications in e-commerce might include competency standards developed by the IT&T ITAB. Hence, there is a need for a well-coordinated management of the development of e-commerce standards and qualifications.

6. IT competencies related to e-commerce

Summary

This section sets out the competencies that were identified within the 'Multimedia and Online Services Scoping' study, June 1999 and appended to a funding request from the IT&T ITAB in August 1999. It is suggested that, because IT provides the enabling infrastructure for e-commerce, the competencies identified by the IT&T ITAB deserve support, subject to a number of conditions set out later.

IT competencies for e-commerce

The competencies identified within the 1999 scoping study were called 'online services' competencies. The position taken in this study, 'E-competent Australia', is that an online service is a sub-set of e-commerce.

The 1999 scoping study identified a range of possible competencies, which were almost solely technical. Some additional competency areas were added in January 2000. The following up-dated table was provided by the IT&T ITAB in January 2000.

Table 6.1: Possible e-commerce competency areas identified in the 'Multimedia and Online Services Scoping' study, June 1999, with additions made in January 2000 by the IT&T ITAB

Possible E-commerce competency areas	B2B	B2C	Existing ICA99 Standards for review	Possible units of competence
Smart Cards	x	x		1. Develop smart card integrated circuit
	x	x		2. Manufacture microprocessor card
	x	x		3. Develop crypto processors
	x	x		4. Manufacture wireless card
Voice Recognition	x	x		5. Develop interactive voice response system
	x	x		6. Design speech recognition system
	x	x		7. Build speech recognition system
	x	x		8. Design voice commanded computer system
	x	x		9. Research and design voice platform servers
Billing Systems	x	x		10. Design and interconnect billing system
	x			11. Design a wholesale billing system
	x			12. Design a roaming billing system

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	x	x	13. Design a simple billing system
	x	x	14. Ensure data integrity and auditability
	x	x	15. Build bill preparation process
	x	x	16. Build bill rendering process
	x	x	17. Build bill execution process
Computer Telephone Integration	x	x	18. Design a simple Call Centre Communications System (CCCS) *(in collaboration with Telco)*
	x	x	19. Design a large scale Call Centre Communications System (CCCS) *(in collaboration with Telco)*
Internet/Extranet	x	x	20. Design high level interactive distributed system
		x	21. Develop seamless interface between consumer and business
	x		22. Develop seamless interface between business to business
		x	23. Develop seamless interface between Internet and consumer
	x		24. Develop seamless interface between Internet and business to business
	x	x	25. Ensure valid authentication processes
	x	x	26. Confirm valid authorisation process
	x	x	27. Ensure secure encryption technologies are applied
	x	x	28. Implement a secure environment of E-commerce
	x		29. Design web sites for business to business
	x		30. Develop web site for business to business
	x		31. Design portal for business to business
	x		32. Develop portal for business to business
		x	33. Design web sites for business to consumer
		x	34. Develop web sites for business to consumer
		x	35. Design portal for business to consumer
		x	36. Develop portal for business to consumer
	x	x	37. Validate web site
	x		38. Confirm accessibility of web site design for business use
		x	39. Confirm accessibility of web site design for consumer use
	x	x	40. Ensure interactivity of E-commerce website
	x	x	41. Develop web security

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	x	x	42. Confirm web security
	x	x	43. Manage E-commerce websites
	x	x	44. Install and configure a web server
	x	x	45. Ensure web server security
	x	x	46. Administer systems for Internet servers
	x	x	47. Manage content on Internet servers
	x	x	48. Establish operating procedures for tracing messages
Communications	x	x	49. Compile specified traffic reports
	x	x	50. Troubleshoot communications equipment
	x	x	51. Monitor installation, and perform testing to determine the quality and efficiency of automated equipment and software
	x	x	52. Translate the needs of communication users into requirements
	x	x	53. Participate in planning for future systems and capabilities - short term
	x	x	54. Participate in planning for future systems and capabilities - long term
	x		55. Design networks and/or systems to meet planning concepts and objectives for business to business
		x	56. Design networks and/or systems to meet planning concepts and objectives for business to consumer
	x	x	57. Review equipment and facility specifications
	x	x	58. Conduct operational acceptance tests
	x		59. Conduct scalability tests for business to business
		x	60. Conduct scalability tests for business to consumers
	x	x	61. Allocate and control frequency usage
	x	x	62. Refine manual and automated traffic sampling techniques
Networking	x	x	63. Create a protocol for use across a WAN
	x	x	64. Employ best application for encrypted data transfer
	x	x	65. Determine best fit topology for LAN network
	x	x	66. Determine best fit topology for WAN network
	x	x	67. Install ATM network
	x	x	68. Install intelligent hub
	x	x	69. Install and configure router
	x	x	70. Configure a node connected to an Internet gateway

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Applications	x		71. Design real-time collaborative applications for business to business
		x	72. Design real-time collaborative applications for business to consumer
	x		73. Build real-time collaborative applications business to business
		x	74. Build real-time collaborative applications business to consumer
	x		75. Integrate real-time collaborative applications for business to business
		x	76. Integrate real-time collaborative applications for business to consumer
	x		77. Design Internet/Intranet applications for business to business
		x	78. Design Internet/Intranet applications for business to consumer
	x		79. Develop Internet/Intranet applications for business to business
		x	80. Develop Internet/Intranet applications for business to consumer
	x		81. Develop relational databases for business to business
		x	82. Develop relational databases for business to consumer
	x		83. Develop object databases for business to business
		x	84. Develop object databases for business to consumer
	x		85. Build and test interactive applications for business to business
		x	86. Build and test interactive applications for business to consumer
	x		87. Develop web-enabled databases for business to business
		x	88. Develop web-enabled databases for business to consumer
	x		89. Design and build database applications for business to business
		x	90. Design and build database applications for business to consumer
		x	91. Design interactive consumer applications
	x	x	92. Determine best site server tools for E-commerce
Multimedia	x	x	93. Speed up image loading
	x	x	94. Program in OO
	x	x	95. Stream audio/video
	x	x	96. Integrate database with Internet
	x	x	97. Create HTML
	x	x	98. Script a cookie using Java script

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	x	x	99. Create server-side and client-side maps
	x	x	100. Create frames
	x	x	101. Develop ISAP extensions
	x	x	102. Employ multimedia
	x	x	103. Create PEARL scripts
	x	x	104. Apply an authoring tool
	x	x	105. Compress objects
	x	x	106. Create plug-ins
	x	x	107. Define individual MIME types
	x	x	108. Define individual S/MIME types
	x	x	109. Convert binary files to ASCII
	x	x	110. Transmit data using Multicasting Backbone (Mbone)
	x	x	111. Manipulate data using data signal processing
WAP	x	x	112. Build using Wireless Markup Language
	x	x	113. Build using WML Script
	x	x	114. Build a WAP browser
	x	x	115. Develop a Wireless Application Environment
	x	x	116. Develop a WAP site
Voice Recognition	x	x	117. Design voice recognition software
			118. Design a language database
	x	x	119. Develop statistical tools
	x	x	120. Build using VXML
IT Consultancy Services	x	x	121. Determine IT systems requirements in relation to E-commerce
	x	x	122. Analyse workflow implementation related to E-commerce
	x	x	123. Identify integration issues relating to E-commerce implementation
	x		124. Project manage E-commerce implementation for business to business
		x	125. Project manage E-commerce implementation for business to consumer
	x	x	126. Host E-commerce websites
	x	x	127. Install E-commerce software
	x	x	128. Install E-commerce hardware

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	x	x		129. Develop E-commerce strategy
	x			130. Develop IT/E-commerce business strategy for complex business to business
	x			131. Develop IT/E-commerce business strategy for small business to business
		x		132. Develop IT/E-commerce business strategy for business to consumer
	x	x		133. Develop strategic positioning and web performance analysis
Analysis & Design of IT Solutions	x	x	x	134. ICAITAD041A Determine client business expectations and needs
	x	x	x	135. ICAITAD042A Client business needs are confirmed through requirements validation
	x	x	x	136. ICAITAD043A Develop and present feasibility report
	x	x	x	137. ICAITAD047A Determine specifications for the project
	x	x	x	138. ICAITAD048A Develop configuration management
	x	x	x	139. ICAITAD49A Develop logical abstraction from requirements (OOA)
	x	x	x	140. ICAITAD050A Develop detailed component specification from project specification
	x	x	x	141. ICAITAD051A Design client user interface
	x	x	x	142. ICAITAD052A Design IT Security Framework
	x	x	x	143. ICAITAD054A Validate quality and completeness of design
	x	x	x	144. ICAITAD055A Complete transition strategy
	x	x	x	145. ICAITAD056A Prepare disaster recovery/contingency plans
	x	x	x	146. ICAITAD057A Manage a reuse library
	x	x	x	147. ICAITAD058A Skills in object oriented design are applied
Build IT Solutions	x	x	x	148. ICAITB060A Physical database requirements determined
	x	x	x	149. ICAITB061A Physical database implementation monitored
	x	x	x	150. ICAITB062A Data conversion performed
	x	x	x	151. ICAITB063A Data conversion monitored
	x	x	x	152. ICAITB064A Prepare software development review
	x	x	x	153. ICAITB065A Prepare the build phase
	x	x	x	154. ICAITB072A Develop integration blue print
Support IT	x	x	x	155. ICAITS116A Undertake capacity planning

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Solutions				
	x	x	x	156. ICAITS014B Connect hardware peripherals
	x	x	x	157. ICAITS015B Install software applications
	x	x	x	158. ICAITS020B Install and optimise system software
	x	x	x	159. ICAITS021B Connect internal hardware components
Implement IT Solutions	x	x	x	160. ICAITI096A Data Transition completed
	x	x	x	161. ICAITI099A Build an intranet
	x	x	x	162. ICAITI100A Build an internet infrastructure
Use IT Solutions	x	x	x	163. ICAITU127A Operate system software
	x	x	x	164. ICAITU012B Design organisational documents using computing packages
	x	x	x	165. ICAITU013B Integrate commercial computing packages
	x	x	x	166. ICAITU019B Migrate to new use of technology
	x	x	x	167. ICAITU028B Customise packaged software applications for clients

Notes: Feedback during the Telecommunications Training Package review has meant that several competencies identified in the original report have been moved across to the Telecommunications Training Package. The possible units under the heading Communications have been left in IT, rather than Telecommunications, as they relate to network communications such as CISCO, 3Com, Lucent etc. The people undertaking this work are IT people and whilst convergence is occurring in this area it is still very much an IT development, maintenance and support role, as it links strongly with the networking (software/server issues).

The following table sets out possible telecommunication competencies in emerging areas related to e-commerce.

Table 6.2: Possible telecommunications competencies in emerging areas related to e-commerce, provided by the IT&T ITAB

Table 6.2: Possible telecommunications competencies in emerging areas related to e-commerce, provided by the IT&T ITAB

Digital & Interactive TV	1. Determine digital transmission techniques
	2. Employ required dynamic multiplexing techniques
	3. Utilise relevant static multiplexing technique
	4. Determine required compression technologies
	5. Design photonic switching
	6. Employ fast packet switching
Cabling	7. Implement high bit rate Digital Subscriber Line (HDSL)
	8. Utilise Shielded Twisted Pair cable
Computer Telephone Integration	9. Design a Custom Local Area Signalling System (CLASS) network
	10. Design a Custom Local Area Signalling System (CLASS) telephone network

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	11. Design a Caller Line Identification system
	12. Build a Caller Line Identification system
	13. Develop policy for a Caller Line Identification system
	14. Design automatic dialling procedure
	15. Build automatic dialling procedure
	16. Design an automatic call distributor system
	17. Build an automatic call distributor system
	18. Design a voice processing system
	19. Design an integrated call processing platform (Voice/Data)
	20. Build an integrated call processing platform (Voice/Data)
	21. Design a simple Call Centre Communications System (CCCS) (*in collaboration with IT*)
	22. Design a large scale Call Centre Communications System (CCCS) (*in collaboration with IT*)
Datacasting	23. Datacast information using the Vertical Blanket Interval (VBI) to multiple ites
	24. Develop a transaction automation system
Photonics	25. Design architectures for fibre-wireless access systems
	26. Develop architectures for fibre-wireless access systems
	27. Design optically fed wireless local area networks
	28. Develop optically fed wireless local area networks
	29. Design optical fibre backhaul networks
	30. Develop optical fibre backhaul networks

The items in the above two tables are an indication from the IT&T ITAB of the possible range of technical competencies needed for e-commerce. These indicative competencies will need to be the subject of further negotiation.

IT provides many of the enabling tools necessary for e-commerce to flourish. Hence, IT&T competencies in e-commerce will stimulate the development of e-commerce. The development of the above competencies is an important basis for development of e-commerce more widely.

7. Advice on the use of Guideline Standards for e-commerce

Summary

ANTA is advised to be restrained in the use of Guideline Standards for e-commerce.

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particularly in the first twelve-month period of developing competency standards for e-commerce, for the following reasons:

1. Despite the common sense behind the theory of Guideline Standards, they are new and untried, with the first exemplars from Food Safety not due for release until March 2000
2. a number of key aspects of Guideline Standards need to be field-tested before the concept becomes widespread within the NTF, including issues such as their status, the provision of guidance while maintaining flexibility and their equivalence
3. until the first exemplars of Guideline Standards are field-tested, it would be a high risk strategy to invest too much effort developing Guideline Standards in e-commerce
4. ITABs lack experience with Guideline Standards and, at present, generally have a negative perception of them
5. Guideline Standards are not easily applied to e-commerce due to the complexity of e-commerce, its changing nature (arising from the continual convergence of technologies and the development of new business models) and its uneven impact across industries
6. the preferred strategy for managing e-commerce within the National Training Framework is to give priority to the development of e-commerce competencies in a number of Training Packages, including Information Technology, Business Services and Financial Services. The use of Guideline Standards can be a supplementary strategy.

Introduction

Advice about the use of Guideline Standards for e-commerce is influenced by three major factors: the history, nature and perception of Guideline Standards within the National Training Framework; the nature of e-commerce as defined in a previous section of this report; and the recommendation in the next section about the preferred option for managing e-commerce within the National Training Framework. These three factors provide the framework for the body of this section of the report. First, however, it is necessary to describe the background and research methodologies used.

Background

This study of the impact of e-commerce on the National Training Framework (NTF) comprises three inter-related tasks: to develop a definition of e-commerce, to provide advice on the use of Guideline Standards for e-commerce and to prepare a project brief outlining the tasks that need to be undertaken relating to e-commerce and the NTF.

In relation to the second of these tasks concerning Guideline Standards, the specific requirement is to:

> Provide advice to ANTA on the development of Guideline Standards for e-commerce in the context of the growing impact of e-commerce upon all industries and education and

training.

This section of the report addresses the above requirement.

Research methodologies

The investigation into the use of Guideline Standards for e-commerce within the NTF involved the use of a number of methodologies:

- examination of ANTA documents on the topic of Guideline Standards, particularly 'Cross-Industry Commonalities in Training Packages' (paper for NTFC agenda Item 8a, 11 March 1999) and another paper with the same title tabled with the Industry Training Advisory Body Forum, 30-31 March 1999
- an iterative dialogue, focusing on a number of draft documents, with a range of ANTA personnel, particularly Special Adviser Andre Lewis, and personnel from the Industry Relationships section
- workshops with representatives from fourteen ITABs in November 1999, where the issue of Guideline Standards in e-commerce was discussed
- interviews and meetings with a range of ITAB and industry representatives in December 1999 - January 2000, where the use of Guideline Standards in e-commerce was also discussed.

The history and theory of Guideline Standards

The discussion below will highlight four matters regarding Guideline Standards:

- while the theory behind Guideline Standards is generally sound, a number of issues need to be monitored in future, such as their equivalence and the lack of regulatory bodies
- Guideline Standards are new to the NTF and the first exemplars developed since the NTFC policy was finalised in March 1999 — the Food Safety Guideline Standards — are not expected to be completed until March 2000
-
- field testing of the Food Safety Guideline Standards in 2000 may reveal the need for some refining of the concept. Hence, at this stage, developing Guideline Standards for e-commerce involves a degree of risk
- recent discussions with ITABs have shown that they are generally not supportive of the concept of Guidelines Standards, partly because they are a new concept and partly because of the misconception that ANTA funds will not be made available for the customisation of Guideline Standards. There is also a sentiment that if the ITABs don't develop the Guideline Standards, they will have no loyalty to them or feel any ownership of them.

The theory behind Guideline Standards is sound, is based on common sense, addresses a need and could benefit all parties involved. The theory was articulated in a paper prepared by ANTA on 'Cross-Industry Commonalities in Training Packages' and delivered to the Industry Training Advisory Board Forum on 30-31 March 1999. The paper noted that

> The issue of how we handle common or generic competencies that are used in a range of Training Packages and industries has become increasingly important. The issue comes up regularly in negotiations over units to be used in Training Packages with overlapping content. It is becoming an increasing point of contention between industries on the use of common qualifications versus badging for the specific industry. Potentially there could be a source of considerable efficiency in training delivery through development of commonalities in both endorsed standards and qualifications and in non-endorsed resources for Packages. *(p.1)*

The paper then clarified that all units which have been endorsed, whether they are industry or cross-industry, in a sense have 'guideline' status, in that incorporation is encouraged. In addition, the paper noted that there are also units that have not been endorsed that have 'a form of guideline status':

> This approach was developed in relation to units on occupational health and safety produced by Worksafe Australia, which can be incorporated as is or changed. This was designed to give some consistency and depth to occupational health and safety competencies, but not to give these competencies endorsed status. This was because of the recognised need to contextualise these units before training was based on them, and a desire to maintain the industry based approach to who could put standards forward for endorsement. *(p.2)*

The approach involves a recommended 'menu' of units from which ITABs can select. The ITAB can then contextualise these chosen units to suit the particular industry or enterprise conditions. The Worksafe Australia OH&S units were developed before the new policy on Guideline Standards was finalised in March 1999, so they are not a true test of the new policy.

The formal definitions of endorsed and not endorsed units of competency were provided in the March 1999 paper:

> Endorsed– This would cover industry and cross-industry units, with a requirement to use these previously endorsed units wherever possible in other Training Packages unless there was a good reason not to. This would also apply to reviews of packages.
>
> Guideline (not endorsed) – This would cover all types of units that the NTFC notes and would encourage incorporation into Training Packages, but would not endorse. Specific examples are the Worksafe Australia occupational health and safety units, ANZFA food hygiene units, and framework units such as those for electrical competencies. Again, incorporation would also be encouraged in reviews. *(pp.2-3)*

For the first time since the new policy was approved in March 1999, this approach of providing non-endorsed guideline status is being tried for the Food Safety standards. The Food Safety standards will support the new nationally uniform Food Act being developed by the Australia New Zealand Food Authority (ANZFA). The standards are expected to be finalised by March 2000 and will then need to be field-tested.

Discussions with ANTA's Andre Lewis on 4 November 1999 in ANTA's Melbourne offices clarified that there are two possible approaches to the use of Guideline Standards:

- Approach No.1: A suite of skeleton units that can be tailored for endorsement as part of a Training Package (e.g., OH&S; Food Safety)
- Approach No.2: Outline of a set of skills, with cross-industry significance, specific to a certain discipline. This approach may be more appropriate to e-commerce than Approach No.1, but this would be an experiment as it has not been tried before.

In summary, the theory behind the two approaches is sensible. Approach No.1, as demonstrated with the OH&S and Food Safety units, is designed to give a consistency and depth to the competency units. The units can be modified or kept unchanged, and are deliberately not endorsed because of the need for the units to be contextualised and for industries to take ownership for the incorporation of the units. Approach No.2 potentially provides ITABs with guidance, focuses on job functions, describes the scope of application, provides a defined set of skills hierarchically and provides assessment advice.

While the theory is persuasive, discussions undertaken for this study with ITABs showed that some issues involved with the use of Guideline Standards require further deliberation before ITABs will become confident in using them. The issues include:

- the status of Guideline Standards;
- their provision of guidance while maintaining flexibility;
- their equivalence;
- the relationship between different Guideline Standards;
- and the lack of regulatory bodies for Guideline Standards.

Field-testing of the Food Safety Guideline Standards in 2000 may address all of the above issues. Field-testing may also reveal the need for some refining of the concept. Hence, it would seem fair to say that, at this stage, developing Guideline Standards for e-commerce involves a degree of risk. Given the urgent need to develop e-commerce standards, as discussed in a previous section, it would seem wiser to make the development of Guideline Standards in e-commerce a secondary strategy.

The perception of Guideline Standards

Added to these concerns with the newness and robustness of Guideline Standards, recent discussions with many ITABs about Guideline Standards in e-commerce met with a combination of suspicion, ignorance, disinterest and opposition. These reactions can be largely explained by the fact that the use of Guideline Standards is relatively new in the VET sector. One of the major misconceptions is that ANTA funds will not be made available for the customisation of Guideline Standards.

In consideration of the above concerns, it would seem appropriate that some educational activities be provided by ANTA to further encourage ITABs to commit to adopting Guideline Standards. This strategy of providing information and education is part of the proposed approach to e-commerce within the NTF as set out in the previous section.

The nature of e-commerce

The nature of e-commerce was discussed in detail in a previous section. The discussion highlighted the complex and many-sided nature of e-commerce, despite the tendency of some people to see it simply as financial transactions over the Internet. The development of new technologies, the continual convergence of technologies and the development of new business models also affect e-commerce. The discussion also showed that, while the impact of e-commerce is cross-industry, in the next few years it is expected to have more impact in some areas than others.

Guideline Standards are more easily applied to an homogeneous area such as Food Safety than to a heterogeneous area such as e-commerce. Guideline Standards are not easily applied to e-commerce for the reasons cited above: its complexity; its changing nature; and its uneven impact across industries. Additionally, many competency standards for e-commerce can be accommodated within the IT&T and Business Services Training Packages, leaving only a smaller proportion of competencies which could be treated as Guideline Standards.

The preferred option for managing e-commerce

The preferred approach for managing e-commerce within the NTF involves the use of a range of strategies, beginning with the development of a significant range of competencies and qualifications within the IT&T and Business Services. Hence, the use of Guideline Standards is recommended as only one of the supplementary strategies.

Appendix 1: List of personnel consulted

Agnes Vukovic, IT and Arts Media, Educational Services Division, NSW TAFE

Alison Hunter, Public Relations Manager, Transport and Distribution Training Australia, VIC

Andre Lewis, Special Adviser, ANTA, QLD

Andrew McGowan, Education Manager, Douglas Mawson Institute of TAFE, SA

Ann-Marie Yates, Project Manager, Community Services & Health Training ITAB, NSW

Anthony Stiff, Chief Executive Officer, Business Services Training Australia, VIC

Awadh Pandey, Development Manager, Sausage Software, VIC

Barbara Wallace, Project Manager, Manufacturing Learning Australia, NSW

Belinda Smith, Director, SmithComyn Associates, NSW

Beryl Dukes, Project Manager, Forest & Forest Products Employment Skills Company Ltd, VIC

Bill Galvin, OAM, Chief Executive, Tourism Training Australia, NSW

Bill Healy, Executive Director, Australian Retailers Association of NSW

Bob Holland, Human Resources Manager, EDS, NSW

Bob Paton, National Executive Officer, MERS ITAB, NSW

Brian Williams, NSW Financial and Business Services ITAB, NSW

Bruce Mackney, Managing Director, Beroni Pty Ltd (Seafood), NSW

Bruce Rollands, North Coast Institute of TAFE, NSW

Cassandra Parkinson, Executive Officer, Cultural Research Education and Training Enterprise (CREATE) Australia, NSW

Catherine Higgins, Project Manager E-commerce, NOIE, ACT

Chris Hewitt, IT consultant, Apt Workflow Solutions, VIC

Christopher Eccles, General Manager, ANTA, QLD

Cliff Smith, Managing Director Novell Australasia, NSW

Clive Richardson, Field Officer, Meat Industry Advisory Council, ACT

Colin Westwood, Parramatta Branch Manager, Icon Recruitment, NSW

David Edwards, Chief Executive, CPA, VIC

David Thornton, C.E.O., Ause.Net, ACT

David Waden, Sales Adminstration, 131Shop, QLD

Des Caulfield, Executive Officer, National Mining ITAB, NSW

Ella Keenan, Chair, Council of Small Business Organisations of Australia (COSBOA), VIC

Evelyn Goodwin, National Research and Communications Coordinator, MERS ITAB, NSW

Greg Jackson, Managing Director, Novak Tonkin Real Estate, QLD

Jan Febey, National Training Framework Liaison Officer, ANTA, VIC

Jeannine Angilley, Business Services, Educational Services Division, NSW TAFE

John Eastman, Tasmanian Agricultural Productivity Group Ltd, Devonport, TAS

John Jarvis, Executive Director, National Printing Industry Training Council, NSW

John Ridge, President, Australian Computer Society (ACS), NSW

Judith Maddocks, National Business Manager, Telstra Learning, VIC

Kelvin Longhurst, National Learning Manager, Telstra, VIC

Larry Quick, Dow Digital, WA

Leo van Neuren, National Executive Officer, IT&T ITAB, VIC

Leon Smith, National Manager, Property Services ITAB, NSW

Lesley Johnson, Director, Strategic Initiatives, ANTA, QLD

Lesley Tweedly, Manager Training and Development, Business Services Training Australia Ltd, VIC

Liz Ryan, Manager, Electronics Consumer Services, Telstra, VIC

Lorraine Kennedy, HR Manager, Scitec, NSW

Mark Taylor, National Services Manager, Educom Training, NSW

Mary Pinto, Senior Project Officer, ANTA, VIC

Meg Barnett, Executive Officer, Public Service Education Training Australia (PSETA), SA

Michel Hedley, Corporate Relations Manager, Australian Information Industries Association (AIIA), NSW

Ms Ellen Helm, Executive Officer, -Racing Training Australia, SA

Neil Strong, Manager Online Education, TAFE SA

Nic Pearl, Principal Project Officer, Strategic Initiatives, ANTA, QLD

Nicholas Crosling, Chief Executive Officer, Australian Local Government Training, VIC

Paul Byrne, General Manager, ANTA, VIC

Peter Le Cornu, Dean of Faculty, Canberra Institute of Technology, ACT

Peter Moore, Director E-commerce, NOIE, ACT

Peter Reddy, A/Executive Officer, Finance ITAB, VIC

Phil Kiely, Managing Director, Oracle, NSW

Phil McCrae, Internet Commerce Advisor, CSIRO, NSW

Phil Singleton, Chairman, Service Providers Industry Association (SPAN), NSW

Prue Madsen, Project Manager, National Correctional Services Advisory Committee, SA

Renee Ellis, Dow Digital, VIC

Richard Santo, Manager Resources, Adacel, VIC

Rob Bastion, Council of Small Business Organisations of Australia (COSBOA), ACT

Rob Douglas, Marketing Manager, Keycorp, NSW

Robert Mallet, Project Officer, National Small Business Professional Development Program in E-commerce, Office of Vocational Education and Training, TAS

Rodney Spark, Assistant General Manager, Learning Technologies, Office of Post Compulsory Education, Training and Employment, VIC

Romi Slaven, Project Officer, Rural ITAB, NSW

Ross Ord, Acting Executive Officer, Australian Seafood Industry Council, NSW

Rowan Simpson, Project Manager, National Finance ITAB, VIC

Sam Gordon, Executive Officer, NSW Master Fish Merchants Association, NSW

Sandra Fallshaw, Aspect Computing, VIC

Sarah Wood, Project Officer, ANTA, VIC

Sean McCormack, Executive Director, Electro technology, Printing, Information Technology and Communications Industry Training Board, VIC

Sharon Coates, Director, National Training Framework and Industry Relationships, ANTA, VIC

Simon Wallace, Principal Project Officer, ANTA, VIC

Steve Balzary, Director of Employment and Training, Australian Chamber of Commerce and Industry, ACT

Steve Quirk, Principal Project Officer, ANTA, VIC

Sue Dalgliesh, Administration, Australian Drilling Industry Training Committee Ltd, NSW

Susan Briggs, Project Manager, Hospitality ITAB, NSW

Terry Bowden, Project Manager, Automotive Training Australia Limited, VIC

Tom Dale, General Manager, e-commerce, National Office for the Information Economy, ACT

Tony Guihot, Executive Officer, Sport and Recreation Training Australia Pty Ltd, NSW

Tony Palladino, Chief Executive Officer, NUE ITAB, NSW

Tony Vandenburg, Principal Project Officer, ANTA, VIC

Trish McCullough, Project Manager, National Small Business Professional Development Program in E-commerce, Office of Vocational Education and Training, TAS

Valmai Nicoll, State Liaison Officer, ANTA, VIC

Warwick Newson, Senior Project Officer, ANTA, VIC

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